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# Alberta Reproductive Health
## Pregnancies & Births

Surveillance Report
2009

Alberta

Freedom To Create. Spirit To Achieve.

Government of Alberta

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For more information contact:
**Surveillance and Assessment**
Community and Population Health
Alberta Health and Wellness
24th Floor, Telus Plaza North Tower
10025 Jasper Avenue
PO Box 1360 STN MAIN
Edmonton, Alberta T5J 2N3
CANADA

Phone: 1 (780) 427-4518
Toll Free: 310-0000 (in Alberta only)
Fax: 1 (780) 427-1470
Email: health.surveillance@gov.ab.ca
Internet: http://www.health.alberta.ca

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## *Working Group*

| | |
|---|---|
| **Michael Sanderson (Project Lead)** | Manager, Surveillance and Assessment, AHW |
| **Fred Ackah** | Statistician, Surveillance and Assessment, AHW |
| **Nancy Bott** | Coordinator, Information Management, APHP |
| **Donna Boyd** | Health Information Analyst, APHP |
| **Gary Gilham** | Information Analyst, Performance Measurement , AHW |
| **Leslie Twilley** | Consultant, Entelechy Resources |
| **Fu-Lin Wang** | Epidemiologist, Surveillance and Assessment, AHW |

## *Expert Advisory Group*

| | |
|---|---|
| **Michael Sanderson (Chair)** | Manager, Surveillance and Assessment, AHW |
| **Nancy Bott** | Coordinator, Information Management, APHP |
| **Nestor Demianczuk** | Professor of Obstetrics and Gynecology, University of Alberta |
| **Nonie Fraser-Lee** | Manager, Alberta Health Services |
| **Grace Guyon** | Coordinator, Quality Improvement, APHP |
| **Joan Ing** | Information Resource Coordinator, Alberta Health Services |
| **Irene Mazurenko** | Project Manager, Public Health Strategic Policy and Planning, AHW |
| **Celia Posyniak** | Executive Director, Kensington Clinic |
| **Suzanne Tough** | Team Leader, Decision Support/Research Team, University of Calgary/Alberta Health Services |
| **Leslie Twilley** | Consultant, Entelechy Resources |

AHW = Alberta Health and Wellness
APHP = Alberta Perinatal Health Program

Alberta
Perinatal Health
Program

Alberta Reproductive Health
Pregnancies and Births 2009

Government
of Alberta

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# 1. Executive Summary

## 1.1 Executive Summary

# 1. Executive Summary

## 1.1 Executive Summary

# 1.1 Executive Summary

Indicators of the reproductive health of the women of Alberta are strongly positive overall. With the rapid pace of change in reproductive health technologies and the evolving demographics of the population, it is important to monitor trends in order to continue to optimize the reproductive health of Albertans.

During the time period studied in this report, migration of workers into Alberta increased, and those workers were often of reproductive age. Fertility rates, independent of population size, also climbed. Both of these factors led to increasing numbers of pregnancies and births. The estimated pregnancy rate showed a strongly increasing trend. Some of the components of the pregnancy rate (live births and spontaneous abortions) increased, while others were stable over time (induced abortions and stillbirths). Rates of reproductive care services such as labour induction, epidural analgesia, and cesarean section continued to increase. The rate of vaginal birth after cesarean section decreased. The trend toward delayed childbearing continued in Alberta, although Alberta mothers were younger than the Canadian average. Maternal obesity rates were high but not increasing, and the rates of other less common pre-pregnancy maternal morbidities remained stable. Gestational diabetes and prenatal hypertension rates increased over time. Maternal prenatal smoking rates declined slowly, while prenatal alcohol consumption and drug dependence rates showed increases. Small-for-gestational-age and low birth weight rates increased, while large-for-gestational-age and high birth weight births were less common. The preterm birth rate decreased in 2006 and 2007 after years of increase. The multiple birth rate also stabilized. Some types of congenital anomalies showed increasing trends with time. Stillbirth and infant mortality rates were stable, with a decreasing trend in post-neonatal mortality. Maternal mortality was low. Postpartum depression was common but rates were stable over time. Breastfeeding initiation rates were high and unchanged over time.

## Pregnancies

### Estimated Pregnancies

Estimated pregnancies were especially high in 2006 and 2007.

- The estimated pregnancy rate climbed markedly in 2006 and 2007, after smaller increases between 2003 and 2005. In 2007, there were 74.6 estimated pregnancies for every 1,000 women between 15 and 49 years of age, compared with 67.9 in 1998.

### Spontaneous Abortions

Spontaneous abortions increased with the increased pregnancy rate, but the proportion of pregnancies ending in spontaneous abortion was unchanged.

- Along with the increase in estimated pregnancies, the rate of spontaneous abortions (per 1,000 women 15-49) increased from 5.6 in 2002 to 6.5 in 2007.
- When measured as percent of estimated pregnancies, there was no time trend in the spontaneous abortion rate between 1998 and 2007. In 2007, there were 8.8 spontaneous abortions for every 100 estimated pregnancies.

# 1.1 Executive Summary

## Reproductive Care Services

*Induced abortions*

The rate of induced abortions did not increase with increasing pregnancy rates; the proportion of pregnancies ending in induced abortions decreased.

- The rate of induced abortions (per 1,000 women 15-49) did not vary significantly with time between 1998 and 2007. The rate was 13.6 in 2007.
- As a proportion of estimated pregnancies, the induced abortion rate decreased over time. In 2007, 18.3% of estimated pregnancies ended in induced abortions in Alberta, compared with 20.2% in 2000.

*Labour Induction*

The labour induction rate increased from 1997 to 2005.

- In 2006, 26.8% of hospital deliveries involved induction of labour. This rate increased from 23.6% in 1997 to 29.2% in 2005 and dropped in 2006.

*Deliveries*

Epidural analgesia and cesarean section rates increased. Vaginal births after cesarean section decreased.

Forceps and vacuum extraction rates were stable.

- In 2006, almost half (44.2%) of hospital deliveries included epidural analgesia in Alberta, up from 36.0% in 2000.
- Forceps deliveries have not increased in frequency over the last several years. In 2006, 5.6% of deliveries were assisted by forceps.
- The vacuum extraction rate has also been quite stable over several years. 11.4% of hospital deliveries had vacuum extraction in 2006.
- There was a steady increase in the cesarean section rate from 1997 to 2006. Just over one in four (26.7%) of hospital deliveries were by cesarean section in 2006, compared with 16.5% in 1997.
- Vaginal births after cesareans decreased between 1997 and 2006; in 2006, vaginal births occurred after 19.4% of previous cesearean deliveries, compared with 42.8% in 1997.

Episiotomy rates decreased, while shoulder dystocia increased in frequency.

- There was a decrease in the episiotomy rate between 2000 and 2006. The rate was 13.1 (per 100 hospital deliveries) in 2006 and 20.4 in 2000.
- One in twenty hospital deliveries (4.7%) involved a case of shoulder dystocia in 2006. The incidence of shoulder dystocia increased from 1.5% in 1997.

## Maternal Factors

*Maternal Age*

Average maternal age was 29.1 years in 2007, with a growing proportion of women giving birth after the age of 35 years.

- The average age of all women giving birth to live infants increased from 28.6 years in 1998 to 29.1 years in 2007; the average age at first live birth increased from 26.7 to 27.4 years.
- Women 35 years of age or older made up 15.4% of all women giving birth to live infants in 2007 and 13.3% in 1998.

*Maternal Pre-Pregnancy Conditions*

Maternal obesity rates were high but stable.

- The maternal obesity rate increased from 2000 to 2002 and then stabilized. In 2006, 8.7% of Alberta women giving birth had a pre-pregnancy weight of more than 91 kg.

Pre-pregnancy diabetes, heart disease, and hypertension were rare.

- Other pre-pregnancy conditions occurred in less than 1% of women in 2006 (diabetes 0.7%, heart disease 0.6%, hypertension 0.9%, renal disease 0.1%).
- There were no time trends in the rates of pre-pregnancy diabetes, heart disease, or hypertension from 2000 to 2006.

# 1.1 Executive Summary

Gestational diabetes and pregnancy-induced hypertension increased.

*Maternal Prenatal Morbidity*

- There was an increase in gestational diabetes from 3.2% of women delivering in 2000 to 3.9% in 2006.
- In 2006, 5.7% of women delivering had pregnancy-induced hypertension; this rate increased over time from 4.9% in 2000.
- Prenatal bleeding prior to 20 weeks gestation was reported by 5.8% of women in 2006, and 3.5% of women reported prenatal bleeding at or after 20 weeks. Bleeding both before and after 20 weeks was reported by 0.8% of women giving birth in 2006. There were no time trends in any of these rates.

Maternal prenatal smoking rates decreased, but alcohol consumption and drug dependence increased in frequency.

*Maternal Prenatal Smoking*

- There is a downward trend in prenatal smoking rates in Alberta. In 2006, 19.0% of women delivering in Alberta smoked at some point during their pregnancies, compared with 23.4% in 2000.

*Maternal Prenatal Alcohol Consumption*

- In 2006, 2.5% of women giving birth reported that they had consumed three or more drinks on any one occasion during pregnancy, or one or more drinks per day throughout pregnancy. This rate increased from 1.2% in 2000.

*Maternal Prenatal Drug Dependence*

- For 1.5% of births in Alberta in 2006, mothers reported being dependent on drugs. This is triple the rate of 0.5% in 2000.

Almost all pregnant women in Alberta were screened for HIV and Hepatitis B.

*Maternal Prenatal HIV and HBV Screening*

- The percentage of women receiving prenatal care who were screened for HIV increased from 92.2% in 1998 to 97.0% in 2006. 32 pregnant women tested positive for HIV in Alberta in 2006.
- All women receiving prenatal care in Alberta are screened for Hepatitis B virus (HBV). In 2006/07, 5.6 out of every 1,000 live births occurred to women who tested positive for HBV.
- In 2006, 4.5 out of every 1,000 pregnant women were found to be HBV carriers from an earlier infection. This rate increased from 3.2 in 1998.

# Births

## Fertility Rates

General fertility and total fertility rates increased. Alberta women had about 1.9 live births each in their lifetimes as of 2007.

- The general fertility rate was 54.0 live births (per 1,000 women 15-49 years) in 2007. This rate increased starting in 2003, with large jumps in 2006 and 2007. The ten-year low was 45.7, in 2000.
- In 2007, the Alberta total fertility rate was 1,922 (about 1.9 live births per women during her lifetime). This rate is also increasing; the ten-year low was 1,661 in 2000.

# 1.1 Executive Summary

Alberta had a record number of live births in 2007.

The home birth rate was stable, but more births were attended by midwives than in the past.

## Live Births

- There were 48,348 live births in Alberta in 2007. This is the largest number ever recorded.
- The crude birth rate increased from 2003 to 2007, especially in 2006 and 2007. In 2007, the rate was 14.2 (live births per 1,000 population), compared to the ten-year low of 12.3 in 2000 and 2001.
- In 2007, there were 379 live home births in Alberta (0.8% of live births). This rate was stable between 1998 and 2007.
- The percentage of births attended by midwives is increasing. In 2007, 1.4% of live births were attended by midwives; just over half of these births occurred in hospitals. The rate was 0.5% in 1998.

Rates of smaller birth weight babies increased, and rates of large birth weight babies decreased.

## Birth Weight

*Small-for-Gestational-Age*

- The singleton small-for-gestational-age rate decreased from 9.1 (per 100 live singleton births) in 1998 to 7.6 in 2002 and 2003 and then increased. In 2007, the rate was 8.1

*Low Birth Weight*

- The low birth weight rate increased from a ten-year low of 5.9 in 1999 to 7.0 in 2006. In 2007, the rate was 6.6.

*Large-for-Gestational-Age*

- The large-for-gestational-age rate decreased after reaching 12. 5 (per 100 singleton live births) in 2001. In 2007, the rate was 11.0.

*High Birth Weight*

- The high birth weight rate decreased to 11.0 (per 100 live births) in 2007, after reaching a ten-year high of 12.9 in 2000 and 2001.

The preterm birth rate decreased in 2006 and 2007.

## Preterm Births

- After increasing from 7.5 (per 100 live births) in 1998 to 9.1 in 2004 and 2005, the preterm birth rate in Alberta decreased in 2006 and 2007. The rate was 8.4% of live births in 2007.

The multiple birth rate stabilized at just over 3% of live births.

## Multiple Births

- The multiple birth rate also increased from 1998 to 2004 (from 2.7 to 3.4 per 100 live births), and then leveled off. There were 1,574 multiple live births in Alberta in 2007, or 3.3% of live births.

Respiratory distress syndrome affected just over 1% of infants in 2006.

## Infant Morbidity

*Respiratory Distress Syndrome*

- The rate of respiratory distress syndrome in infants was 12.6 (per 1,000 hospital deliveries) in 2006. This rate increased from 11.6 in 1997 to 15.8 in 2002 and was variable after that time.

The rate of all congenital anomalies combined increased over time.

*Congenital Anomalies*

- Congenital anomalies increased in frequency overall. In 2006, there were 1,634 babies with anomalies reported, for a rate of 36.3 (per 1,000 total births), compared with 31.1 in 1997. Down Syndrome and urinary obstructive defects showed increasing trends between 1997 and 2006.

# 1.1 Executive Summary

Stillbirths, perinatal deaths, neonatal deaths, and infant deaths did not show time trends. The post-neonatal mortality rate decreased.

Maternal mortality rates were low and stable.

Early postpartum hemorrhage rates increased.

Postpartum depression rates were stable. About one in ten Alberta women was diagnosed with depression within 12 months of giving birth.

The large majority of newborns were breastfeeding at discharge from hospital.

## Mortality

*Stillbirths*

- There was no change over time in the stillbirth rate in Alberta from 1998 to 2007. In 2007, there were 342 stillbirths (7.1 per 1,000 total births).

*Perinatal Mortality*

- There were 532 perinatal deaths in 2007, for a rate of 10.5 (per 1,000 total births). There was no significant time trend between 1998 and 2007.

*Neonatal Mortality*

- The neonatal mortality rate increased from 2.8 (per 1,000 live births) in 1998 to a ten-year high of 5.2 in 2002. In 2007, there were 220 neonatal deaths (4.6 per 1,000 live births).

*Post-Neonatal Mortality*

- The post-neonatal mortality rate decreased in Alberta from a high of 2.4 (per 1,000 live births) in 2000, to 1.9 (70 deaths) in 2007.

*Infant Mortality*

- There was no change over time in the infant mortality rate from 1998 to 2007. In 2007 there were 290 infant deaths in Alberta (6.0 per 1,000 live births).

*Maternal Mortality*

- There were three maternal deaths in Alberta in 2006. The rate of maternal mortality is very low in Alberta, and has been stable since the mid-1970s.

## Maternal Factors

*Maternal Postnatal Morbidity*

- The postpartum hemorrhage rate increased from 10.6 (per 100 live births) in 1997 to 12.5 in 2000, before stabilizing between 11.8 and 12.0 from 2001 to 2004. In 2006, the postpartum hemorrhage rate was 13.4 (per 100 live births). The rate increase is due to an increase in early postpartum hemorrhages.
- Postpartum depression rates did not vary with time between 2000 and 2006. In 2006, 6.8% of women were diagnosed with depression within six months of delivery, and 10.0% within 12 months of delivery.

*Breastfeeding*

- Most Alberta infants born in hospitals are breastfeeding when they are discharged from hospital. The rate (86.0% of newborns in 2006) increased slightly over time (from 85.3% in 2000).

For further information on any aspect of this report, please contact the Surveillance and Assessment branch of Alberta Health and Wellness.

**Alberta Reproductive Health Report 2009**

# *2. Introduction*

*2.1 Background*
*2.2 Methodology*
*2.3 Summary Table*

# 2. Introduction

## *2.1 Background*

ALBERTA
Perinatal Health
PROGRAM

ALBERTA REPRODUCTIVE HEALTH
PREGNANCIES AND BIRTHS 2009

Government
of Alberta ■

## 2.1 Background

This report follows the Alberta Reproductive Health: Pregnancies and Births 2006 report, and the Alberta Reproductive Health: Pregnancies and Births Table Update 2007.

This report has been produced by Alberta Health and Wellness in collaboration with the Alberta Perinatal Health Program.

The Alberta Reproductive Health: Pregnancies and Birth report has been produced since 1997 (previously titled Reproductive Health: Pregnancy Outcomes Alberta). Full editions were published in April 1999, December 1999, 2001, 2002, 2004 and 2006. An update of selected tables was published in 2005 and 2007. This edition will be followed by a table update later in 2009.

The report is intended to provide an overview of the reproductive health of Albertan women and their infants. Extensive information is provided on pregnancies and births, including outcomes, determinants, and care services.

# *2. Introduction*

## *2.2 Methodology*

*2.2.1 General Methodology Notes and Limitations*
*2.2.2 Contents*
*2.2.1 Data Sources*

## 2.2.1 General Methodology Notes and Limitations

### Populations Used

Populations used for the calculations of some rates are derived from the Alberta Health Care Insurance Plan Registration Files. Population figures used in calculations are in Appendix 6.4.1. All populations are by calendar year, and were based on mid-year estimates (June 30).

Only Alberta residents are included in analyses unless otherwise stated. Provincial rates include Alberta residents with an 'unknown' regional health authority (RHA) code.

### Data Sources

National comparisons are made where possible. Where Canada and Alberta data are compared, a single data source (usually Statistics Canada data) is used to ensure that data collection and extraction are consistent. The Alberta data used in these comparisons may differ from those provided in other analyses that do not involve national comparisons.

Live birth statistics and some of the stillbirth statistics are derived from Vital Statistics Birth Registration Files and post-neonatal and infant death statistics are derived from Vital Statistics Death Registration Files. Registration of births and deaths in Alberta is legally required, and the files are believed to be virtually complete. Births, stillbirths, and deaths to non-Alberta residents occurring in Alberta have been excluded, except where otherwise mentioned.

The Alberta Perinatal Health Program reviews cases of perinatal, neonatal and maternal mortality. Case information is received from the health records departments of Alberta hospitals, hospital perinatal review committees, offices of medical examiners, vital statistics, and physicians. Collaboration and cooperation from health records staff, hospital perinatal review committees and office of medical examiners help to ensure that case information is complete. Variables from case reviews are entered into a mortality database and form the basis for the mortality analysis part of this report. A validation process with Vital Statistics, Alberta Health and Wellness, and health records departments ensures that all cases are received for review.

## 2.2.1 General Methodology Notes and Limitations

### Statistical Notes

Wherever possible and appropriate, data are stratified by factors such as regional health authorities (RHAs), age groups, time periods, birth weight groupings, and risk factors. 'Residence RHA' refers to the regional health authority in which the mother resided at the time of the relevant event. All analyses reflect the December 2003 RHA boundaries.

Appendix 6.3.1 contains a detailed description of the procedure for generating maps, figures and cartograms for the interpretation of regional rates. Rates that are significantly lower than the provincial mean are denoted in green in regional maps, figures, and cartograms, while significantly higher rates are shown in red. Because more than two-thirds of all women of reproductive age in Alberta reside in either Capital or Calgary Health Region, the provincial means are strongly influenced by these two RHAs. Significant differences from the provincial mean do not necessarily indicate areas of concern; differences must be interpreted in the context of all relevant factors.

The statistical analyses included here are mainly descriptive, including frequencies, rates, percentages, means, and standard errors. Differences are interpreted in terms of confidence intervals. Confidence intervals are plotted on figures and are not always easily visible when they are very small. With rare events (such as mortalities) or detailed breakdowns, rates may be based on small numbers, which reduces their statistical reliability. Caution should always be exercised in interpreting these rates. Data are often combined across three-year or longer periods to increase reliability of rates.

In some cases, linear or quadratic effects are described. Linear effects refer to a straight-line relationship between two variables (either an increasing or a decreasing trend). Quadratic effects are non-linear: The relationship between two variables in this case is captured by a second-order (quadratic) polynomial. A quadratic function results in a curve with one change of direction, for example a decrease followed by an increase (a U-shaped curve). Note that these effects are simply descriptions of trends, and are not intended to be predictive of future relationships.

Because of differences in definitions and dates of extracting data for analyses, the statistics in this report may not be the same as those previously published by Alberta Health and Wellness.

## 2.2.1 General Methodology Notes and Limitations

### Interpretation Cautions

Beginning with April 2002 data, new coding systems for classification of diseases (International Statistical Classification of Diseases and Related Health Problems Tenth Revision, Canada (ICD-10-CA)) and interventions (Canadian Classification of Health Interventions (CCI)) are in use for Hospital Inpatient Files and the Ambulatory Care Classification System files. For data prior to April 2002, the International Classification of Disease – 9th Revision – Clinical Modification (ICD-9-CM)) Codes were used for these databases (these codes are still used in the Fee-for-Service Claims files). Because the coding systems are different, there may be discrepancies between 2002 data and data for prior years. Comparisons of data coded with ICD-10-CA or CCI and those coded with ICD-9-CM should be undertaken with caution.

Reporting tends to improve with time, so time trends must be interpreted with caution for those datasets in which reporting variability is possible. There may also be regional differences in reporting and coding for those data that are acquired from the health regions.

Diagnostic criteria for diseases and conditions may change over time, affecting the interpretation of time trends.

Increased awareness of diseases and conditions may lead to increased diagnosis rates. There is always a possibility that diseases and conditions are misdiagnosed, though such occasions are expected to be rare.

The rates for conditions and diseases represent only those patients seeking care. The rates may therefore be expected to be underestimates of the true underlying rates.

There may be access issues that apply to more remote regions of the province, with some services (such as epidural analgesia and induced abortions) being less available in those areas. Any known discrepancies in access should be taken into account when interpreting regional rates.

The reader is reminded that population statistics cannot be applied to individuals. Not every member of a population will exhibit the characteristics that define the population.

## 2.2.1 General Methodology Notes and Limitations

RHA 5 contains the city of Lloydminster, which is on the Alberta-Saskatchewan border. The hospital in Lloydminster is on the Saskatchewan side of the border, and births and services received at this hospital by Alberta residents are recorded in Saskatchewan's administrative databases. These data are not included in this report, *with the exception of data obtained from the Alberta Perinatal Health Program (APHP), which do contain births to Alberta residents occurring in Lloydminster* (see Section 2.2.3 Data Sources).

This means that a substantial portion (approximately one quarter) of births and services occurring to Alberta residents in RHA 5 are missing from the tables, figures, and maps in this report (those that do not use APHP data). Interpretation of RHA 5 data should be carried out with caution. Of particular concern are measures in which the denominator is based on the population of RHA 5, rather than the number of births occurring in RHA 5. Even when the denominator is the number of births occurring in RHA 5, there is the opportunity for bias, as RHA 5 residents that have births at Lloydminster Hospital may be different from RHA 5 residents that have births within RHA 5.

As an example, consider the figure titled 'Crude Birth Rate by Residence RHA, Alberta, 2005 to 2007' on page 113 (table 4.2.1.2). Note that the crude birth rate for RHA 5 (8.8 per 1000 population) was much lower than any other RHA. When calculating the crude birth rate, births that occurred in Lloydminster Hospital to RHA 5 residents to were not included in the numerator. It has been estimated that in 2005, 2006 and 2007 there were approximately 400 births per year at Lloydminster Hospital to Alberta residents, and that approximately 350 were to residents of RHA 5. If an additional 350 births per year are included in the numerator of the crude birth rate for RHA 5 from 2005 to 2007, the adjusted crude birth rate becomes (2959 + 1050) / 335,784 = 11.9 births per 1000 population. While still lower than all other RHAs the adjusted crude birth rate is much closer to the provincial average.

Because the number of births at the Lloydminster hospital to Alberta residents can only be estimated from indirect sources, similar attempts to adjust measures for RHA 5 have not been included elsewhere in the report.

## 2.2.2 Contents

Data consist of pregnancy and birth data primarily for the calendar years 1997 to 2006 or 1998 to 2007 (or subsets thereof), including:

- spontaneous abortions
- induced abortions
- labour inductions
- deliveries (epidural analgesia, forceps, vacuum extraction, cesarean section, vaginal birth after cesarean section, episiotomy, shoulder dystocia)
- maternal factors (age, pre-pregnancy conditions, prenatal morbidity, prenatal smoking, alcohol consumption and drug dependence, prenatal screening)
- fertility
- live births
- birth weight
- preterm births
- multiple births
- infant morbidity
- stillbirths
- perinatal, neonatal, and infant mortality
- maternal mortality
- maternal postnatal morbidity
- breastfeeding

## 2.2.3 Data Sources

Data sources appear below; in the left column are the indicators generated from these sources.

**Indicators from AHCIP registry:**
- Populations for rate calculations throughout the report
- Demographic information (age, gender, region of residence)

### Alberta Health Care Insurance Plan (AHCIP) Registry

The AHCIP Registry was established to enable premium collection and assessment of registrant eligibility for services claimed by medical practitioners. The current report used demographic information from this database. The **Alberta Stakeholder Registry Population Files** are derived from the Registry and were used to estimate the population of the province and its regions. Region of residence is determined by the resident's postal code.

**Indicators from ACASS:**
- Congenital anomalies

### Alberta Congenital Anomalies Surveillance System (ACASS)

ACASS is a congenital anomalies registry system that is funded by the Surveillance and Assessment Branch, Alberta Health and Wellness. ACASS obtains information about infants (under one year of age) with congenital anomalies from a variety of sources, including the Notice of a Live birth or a Stillbirth and the Notice of Birth (NOB), medical certificates of stillbirth, and medical certificates of death. A notification form called the Congenital Anomaly(ies) Reporting Form is completed by hospital health records personnel following the birth or an admission of an affected child. Because many children with congenital anomalies are not admitted to hospital, out-patient information is also obtained (Alberta Health and Wellness, 2001).

**Indicators from national sources:**
- National comparisons throughout report

### Statistics Canada/Public Health Agency of Canada/Health Canada

Data on a variety of topics from various branches of the federal government were used throughout the report, primarily to provide comparisons between Alberta and Canada on selected measures. Readers are referred to the cited sources for these data.

**Indicators from Vital Statistics:**
- Live births
- Stillbirths
- Maternal age
- General fertility
- Age-specific fertility
- Birth attendant
- Location of birth
- Life expectancy
- Birth weight
- Preterm birth
- Multiple birth
- Infant mortality (including neonatal, post-neonatal)

### Vital Statistics

Vital Statistics data are managed by Service Alberta. Vital Statistics data used in this report include records of live births, stillbirths, and deaths before one year of age.

## 2.2.3 Data Sources

**Indicators from clinic files:**

- Induced abortions

**Indicators from hospital inpatient files:**

- Labour inductions
- Deliveries indicators (forceps, vacuum extraction, cesarean section, vaginal birth after cesarean section)
- Breastfeeding at hospital discharge
- Shoulder dystocia
- Respiratory distress syndrome
- Postpartum hemorrhage
- Postpartum depression

**Indicators from ACCS:**

- Shoulder dystocia
- Respiratory distress syndrome
- Postpartum hemorrhage
- Postpartum depression

**Indicators from AHCIP Fee-for-Service Claims:**

- Spontaneous abortions
- Hospital induced abortions
- Shoulder dystocia
- Respiratory distress syndrome
- Postpartum hemorrhage
- Postpartum depression

**Indicators from APHP:**

- Epidural analgesia
- Episiotomy
- Maternal pre-pregnancy conditions (obesity, diabetes, heart disease, hypertension, chronic renal disease)
- Maternal prenatal morbidity (gestational diabetes, pregnancy induced hypertension, , prenatal bleeding)
- Maternal prenatal smoking, alcohol consumption, and drug dependency
- Mortality (stillbirth, perinatal, neonatal, maternal)

### Clinic Files, Alberta Health and Wellness

The Clinic files provided data on gestational week and facility for induced abortions in Alberta. This is an administrative database maintained by Alberta Health and Wellness.

### Hospital Inpatient (Morbidity) Files

Hospital morbidity data consist of one record for each inpatient separation (discharge, transfer, or death) in acute care hospitals in Alberta. Prior to 2002, inpatient data was collected by hospitals and submitted to the Canadian Institute for Health Information (CIHI). CIHI edited and delivered files to AHW. AHW performed certain edits and appended additional data elements. In April 2002, AHW implemented a new system for collecting inpatient data, the Morbidity and Ambulatory Care Abstracting Record (MACAR) system. In MACAR, the hospitals submit data directly to AHW and an edited file is then delivered from AHW to CIHI. This file is returned from CIHI to AHW.

### Ambulatory Care Classification System (ACCS)

ACCS is a system for the collection and costing of data on facility-based ambulatory care, such as same-day surgery, day procedures, emergency room visits, and community rehabilitation program services occurring in publicly-funded facilities. Like the Hospital Inpatient files, ACCS is part of MACAR.

### Alberta Health Care Insurance Plan (AHCIP) Fee-For-Service Claims

The AHCIP registers Albertans for billable services and pays providers of those services. A detailed database of provider claims for payment is kept (the Fee-For-Service Claims database). Data on services rendered was used in several sections of this report.

### Alberta Perinatal Health Program (APHP) databases

The Alberta Perinatal Health Program collects data on a number of indicators related to perinatal health and mortality. For this report, we used data provided by the APHP from delivery records and from mortality case reviews.

## 2.2.3 Data Sources

Indicators from PLPH Prenatal Screening Database:

- HIV and HBV screening for pregnant women

### Provincial Laboratory for Public Health (PLPH) Prenatal Screening Database

During routine prenatal care in Alberta, blood samples from pregnant women who access prenatal care are sent to the PLPH, where they are tested for HIV (unless declined by the patient), HBV, syphilis, rubella immunity and varicella immunity. Blood samples are also sent to the Canadian Blood Services (CBS) Laboratories, where they are tested for blood typing and Rh factors. (Prior to August 2002, prenatal screening was completed by the CBS, and confirmatory syphilis, HIV and HBV testing was done by the PLPH.) Prenatal screening data in the current report were extracted from the PLPH prenatal screening database.

Indicators from CDRS Database:

- HIV and HBV screening for pregnant women

### Communicable Disease Reporting System (CDRS)

Communicable disease case reports are centrally collected and maintained in the CDRS, which is a secure database managed by the Provincial Program Development and Disease Control Branch of Alberta Health and Wellness.

For each newly diagnosed case, the laboratory report is submitted from the Provincial Laboratory for Public Health (PLPH) or the Medical Officer of Health to the RHA that the patient resides in, and to the CDRS. A reporting form (Notifiable Disease Report (NDR) or HIV/AIDS Case Report) is submitted to the CDRS by the RHA reporting the case (usually the RHA of diagnosis). There is a legal requirement that notification occur. A case only becomes counted as a case in the CDRS upon receipt of both a confirmatory laboratory report and the relevant reporting form.

The CDRS has two systems: the Sexually Transmitted Disease System and the Notifiable Disease System. The Notifiable Disease System was the source for the HIV and HBV data used in this report.

# *2. Introduction*

*2.1 Background*

*2.2 Methodology*

## *2.3 Summary Table*

## 2.3.1 Summary Table

Selected Indicators for Pregnancies and Births, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Live Births | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| Estimated Pregnancies[1] | 52,542 | 52,721 | 51,802 | 52,375 | 53,975 | 55,720 | 56,445 | 57,815 | 61,875 | 66,740 |
| Estimated Pregnancy Rate (per 1,000 women 15-49) | 67.9 | 66.6 | 64.6 | 64.2 | 64.9 | 66.3 | 66.6 | 67.7 | 71.1 | 74.6 |
| Spontaneous Abortions | 4,694 | 4,581 | 4,464 | 4,403 | 4,659 | 4,768 | 4,859 | 5,219 | 5,431 | 5,855 |
| Spontaneous Abortion Rate (per 1,000 women 15-49) | 6.1 | 5.8 | 5.6 | 5.4 | 5.6 | 5.7 | 5.7 | 6.1 | 6.2 | 6.5 |
| Spontaneous Abortion Rate (per 100 estimated pregnancies) | 8.9 | 8.7 | 8.6 | 8.4 | 8.6 | 8.6 | 8.6 | 9.0 | 8.8 | 8.8 |
| Induced abortions | 10,131 | 10,095 | 10,476 | 10,511 | 10,774 | 10,825 | 11,008 | 10,700 | 11,486 | 12,195 |
| Induced Abortion Rate (per 1,000 women 15-49) | 13.1 | 12.7 | 13.1 | 12.9 | 13.0 | 12.9 | 13.0 | 12.5 | 13.2 | 13.6 |
| Induced Abortion Rate (per 100 estimated pregnancies) | 19.3 | 19.1 | 20.2 | 20.1 | 20.0 | 19.4 | 19.5 | 18.5 | 18.6 | 18.3 |
| Total Labour Induction Rate[2] (per 100 hospital deliveries) | 24.1 | 25.4 | 25.9 | 27.0 | 25.8 | 29.0 | 29.2 | 29.1 | 26.8 | - |
| Cesarean Section Rate (per 100 hospital deliveries) | 17.3 | 19.1 | 20.2 | 22.5 | 23.2 | 24.1 | 25.4 | 26.1 | 26.7 | - |
| Mean Maternal Age at Delivery | 28.6 | 28.7 | 28.8 | 28.8 | 28.9 | 29.0 | 29.1 | 29.1 | 29.1 | 29.1 |
| General Fertility Rate (per 1,000 women 15-49) | 48.5 | 47.7 | 45.7 | 45.6 | 46.0 | 47.4 | 47.6 | 48.7 | 51.3 | 54.0 |
| Total Fertility Rate (per 1,000 women 15-49) | 1,728 | 1,717 | 1,661 | 1,670 | 1,687 | 1,736 | 1,740 | 1,777 | 1,855 | 1,922 |
| Crude Birth Rate (per 1,000 population) | 13.1 | 12.9 | 12.3 | 12.3 | 12.4 | 12.7 | 12.7 | 12.9 | 13.5 | 14.2 |
| Singleton Small for Gestational Age Rate (per 100 singleton live births) | 9.1 | 8.3 | 7.9 | 7.8 | 7.6 | 7.6 | 7.7 | 7.9 | 8.1 | 8.1 |
| Low Birth Weight Rate (per 100 live births) | 6.2 | 5.9 | 6.1 | 6.1 | 6.5 | 6.3 | 6.4 | 6.6 | 7.0 | 6.6 |
| Large for Gestational Age Rate (per 100 singleton live births) | 11.4 | 11.6 | 12.3 | 12.5 | 12.1 | 11.9 | 11.9 | 11.1 | 11.1 | 11.0 |
| High Birth Weight Rate (per 100 live births) | 12.3 | 12.6 | 12.9 | 12.9 | 12.5 | 12.1 | 11.6 | 11.2 | 11.2 | 11.0 |
| Preterm Birth Rate (per 100 live births) | 7.5 | 7.8 | 8.5 | 8.3 | 8.6 | 8.8 | 9.1 | 9.1 | 8.9 | 8.4 |
| Multiple Birth Rate (per 100 live births) | 2.7 | 2.7 | 3.0 | 3.1 | 3.2 | 3.2 | 3.4 | 3.2 | 3.2 | 3.3 |
| Congenital Anomalies Rate (per 1,000 total births) | 32.2 | 32.2 | 35.5 | 37.4 | 36.3 | 38.4 | 38.9 | 39.1 | 36.3 | 37.3 |
| Stillbirths | 188 | 267 | 237 | 235 | 249 | 259 | 286 | 309 | 299 | 342 |
| Stillbirth Rate (per 1,000 total births) | 5.0 | 7.1 | 6.5 | 6.3 | 6.5 | 6.5 | 7.1 | 7.4 | 6.7 | 7.1 |
| Perinatal Mortality rate (per 1,000 total births) | 7.1 | 10.0 | 9.7 | 9.2 | 10.6 | 10.5 | 10.9 | 11.6 | 10.1 | 10.9 |
| Neonatal Mortality Rate (per 1,000 live births) | 2.8 | 3.7 | 4.1 | 3.9 | 5.2 | 4.9 | 4.4 | 5.0 | 4.0 | 4.6 |
| Post-Neonatal Mortality Rate (per 1,000 live births) | 1.9 | 2.0 | 2.4 | 1.7 | 2.0 | 1.8 | 1.3 | 1.7 | 1.6 | 1.4 |
| Infant Mortality Rate (per 1,000 live births) | 4.7 | 5.7 | 6.5 | 5.6 | 7.3 | 6.7 | 5.8 | 6.7 | 5.6 | 6.0 |

**Sources**: Vital Statistics, Birth, Death, and Stillbirth Files, Service Alberta, May & August 2008 releases
Fee-for-Services Claims Files, Alberta Health and Wellness, May 08 release
Hospital Inpatient Files, Alberta Health and Wellness, May 08 release
Alberta Congenital Anomalies Surveillance System, October 08 release
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness

**Notes**: 1. Estimated pregnancies include livebirths, stillbirths, spontaneous abortions, and induced abortions
2. Labour inductions were under-reported from April 2002 to March 2003
Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of data extraction

# *3. Pregnancies*

*3.1 Estimated Pregnancies*
*3.2 Spontaneous Abortions*
*3.3 Reproductive Care Services*
*3.4 Maternal Factors*

# 3. Pregnancies

## 3.1 Estimated Pregnancies

## 3.1.1 Estimated Pregnancies

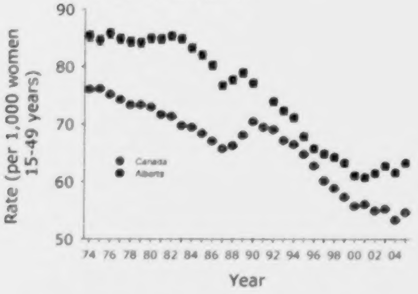
Estimated pregnancies: *The sum of live births, stillbirths, spontaneous abortions, and induced abortions in a population in a given time period.* Few live births, stillbirths, or induced abortions are unreported in Alberta. However, spontaneous abortions that have not been reported to physicians (whether physician care was not sought or the pregnancy went unnoticed) are unaccounted for. Pregnancy rate estimates therefore underestimate true pregnancy rates.

Estimated pregnancy rate: *Number of estimated pregnancies per 1,000 women between 15 and 49 years of age.*

The estimated pregnancy rate is consistently higher in Alberta than in Canada. The rate declined markedly in both Canada and Alberta between 1974 and 2000. Slight declines occurred in 2004 in both Canada and Alberta, followed by small increases in 2005. The Alberta Canada gap narrowed in the early 1990s and then widened again in the late 1990s. In 2005, the estimated pregnancy rate was 63.2 (per 1,000 women) in Alberta, compared with 54.6 in Canada (Statistics Canada, 2008a).

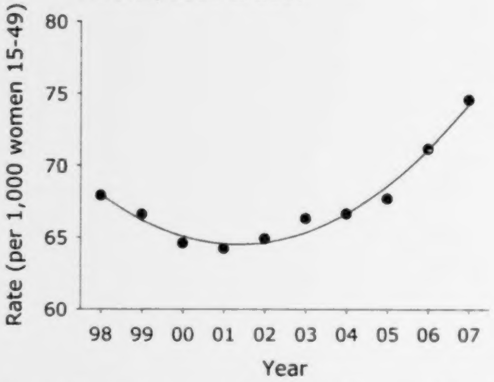
Estimated Pregnancy Rate, Alberta and Canada, 1974 to 2005

Source: Statistics Canada (2008a)



## Time Trends (see Table 3.1.1.1)

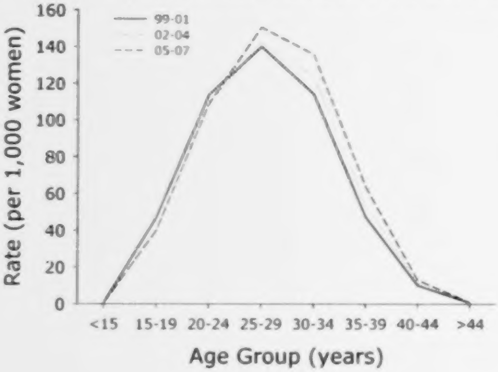
Estimated Pregnancy Rate, Alberta, 1998 to 2007



- The estimated pregnancy rate in Alberta decreased in the late 1990s, and reached a low in 2001. The rate increased from 2002 on, with large increases in 2006 and 2007.
- In 2007, there were 66,740 estimated pregnancies in Alberta, for a rate of 74.6. (per 1,000 women 15-49).

## Age Effects (see Tables 3.1.1.2, 3.1.1.4, 3.1.1.6)

Estimated Pregnancy Rates by Maternal Age, Three-Year Periods, Alberta, 99-01 to 05-07



- Women aged 25-29 years continue to have the highest pregnancy rates of all age groups in Alberta (150.4 for 2005 to 2007 combined), followed by women aged 30-34 (135.7) and then women 20-24 years old (109.0).
- The figure above shows that recent increases in estimated pregnancy rates occurred in mothers 25 to 44 years old, especially the 30 to 34 year age group.

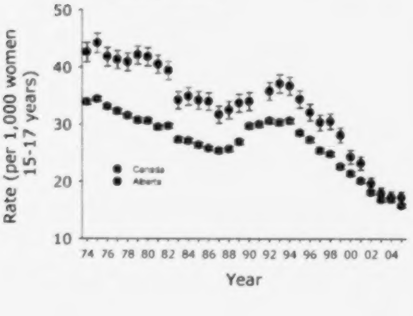
# 3.1.1 Estimated Pregnancies

Pregancy rates are influenced by an interesting mix of factors, including psychological, social, cultural, economic, and biological influences. As many as one half of pregnancies are unintended (Finer and Henshaw, 2006). On the other hand, approximately one in twelve Canadian couples is unable to conceive (Collins, Feeny, and Gunby, 1997). Seven percent of Canadians between the ages of 20 and 34 intend to remain childless (Stobert and Kemeny, 2003).

Teenage pregnancy rates are of interest because of the increased risk of adverse outcomes in pregnancies and births to teenagers. Teenage pregnancy rates in Canada in 2005 decreased to half of the 1974 rates; Alberta rates in 1974 were almost 2.5 times as high as they were in 2005. Similar to overall pregnancy rates, the Alberta teenage pregnancy rate has historically been higher than Canada's. However, since 2003 the teen pregnancy rates in Canada and Alberta have been essentially the same. In 2005, the pregnancy rate for Alberta 15- to 17-year-olds was 17.2 (per 1,000 15- to 17-year-olds), compared with 15.8 in Canada (Statistics Canada, 2008a).

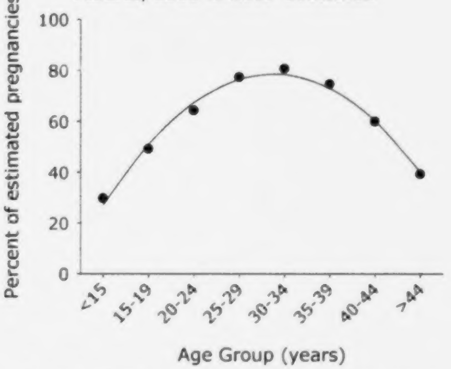
Estimated Pregnancy Rate, 15- to 17-Year-Olds, Alberta and Canada, 1974 to 2005

Source: Statistics Canada (2008a)



## Age Effects continued (see Tables 3.1.1.2, 3.1.1.4, 3.1.1.6)

Estimated Pregnancies Ending in Live Births by Maternal Age Group, Alberta, 2005 to 2007 Combined

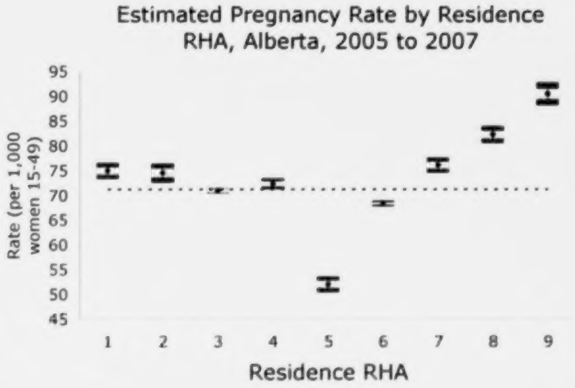


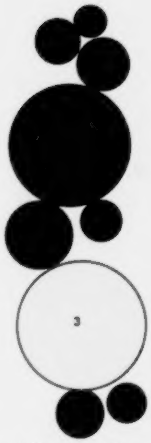
- Women in the age groups with the highest pregnancy rates tend to have the highest percentages of pregnancies ending in live births. For 2005 to 2007, this percentage varied from 29.6% for mothers under 15 years, to 80.5% for 30 to 34 year old mothers, to 39.2% for mothers 45 and older.
- For the youngest mothers, rates of induced abortion are highest, lowering the percent of live births. For mothers 45 and older, rates of induced abortion are also relatively high, but the rate of spontaneous abortion is highest in this age group as well, further lowering the percentage of estimated pregnancies that result in live birth for the oldest mothers.

# 3.1.1 Estimated Pregnancies

Estimated Pregnancy Rate (per 1,000 women), 2005-07 Combined

## Regional Data (see Table 3.1.1.4)





- Estimated pregnancy rates vary by residence RHA in Alberta. The rate was significantly lower than the provincial average in RHAs 5 and 6 for 2005 to 2007 combined. The lowest rate (RHA 5) was 52.0 (per 1,000 women 15-49).
- The estimated pregnancy rate was significantly higher than the provincial average in all other RHAs, with the exception of RHA 3, between 2005 and 2007. The highest rate was in RHA 9 (90.5 per 1,000 women 15-49).
- Increases in the pregnancy rate were seen in every RHA in 2006 and 2007, compared with 2005.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

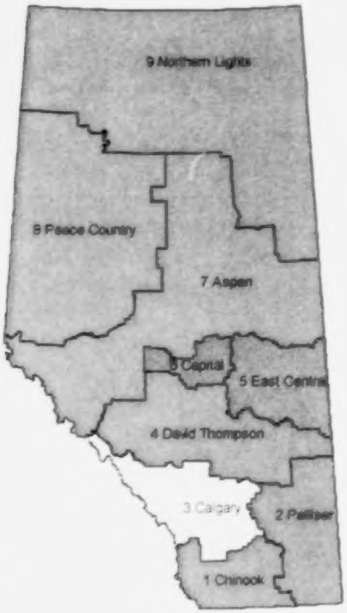
Detailed criteria for data extraction are provided in Appendix 6.1.1.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 estimated pregnancy data to data from prior years due to changes in data coding systems.

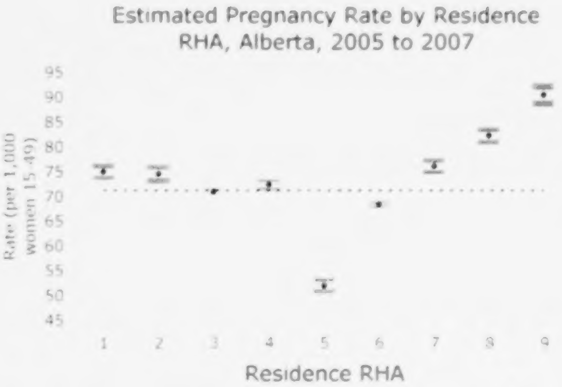
See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

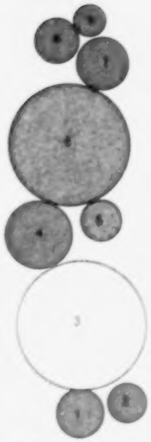
## 3.1.1 Estimated Pregnancies

Estimated Pregnancy Rate (per 1,000 women), 2005-07 Combined



### Regional Data (see Table 3.1.1.4)





- Estimated pregnancy rates vary by residence RHA in Alberta. The rate was significantly lower than the provincial average in RHAs 5 and 6 for 2005 to 2007 combined. The lowest rate (RHA 5) was 52.0 (per 1,000 women 15-49).
- The estimated pregnancy rate was significantly higher than the provincial average in all other RHAs, with the exception of RHA 3, between 2005 and 2007. The highest rate was in RHA 9 (90.5 per 1,000 women 15-49).
- Increases in the pregnancy rate were seen in every RHA in 2006 and 2007, compared with 2005.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

### Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 estimated pregnancy data to data from prior years due to changes in data coding systems

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data

Table 3.1.1.1 Estimated Pregnancies and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Estimated pregnancies** | 52,542 | 52,721 | 51,802 | 52,375 | 53,975 | 55,720 | 56,445 | 57,815 | 61,875 | 66,740 |
| **Women 15-49** | 774,059 | 791,981 | 802,182 | 815,913 | 831,964 | 840,560 | 847,174 | 854,349 | 869,776 | 895,127 |
| **Rate (per 1,000 women 15-49)** | 67.9 | 66.6 | 64.6 | 64.2 | 64.9 | 66.3 | 66.6 | 67.7 | 71.1 | 74.6 |
| **Standard Error (SE)** | 0.29 | 0.28 | 0.27 | 0.27 | 0.27 | 0.27 | 0.27 | 0.27 | 0.28 | 0.28 |

Table 3.1.1.2 Estimated Pregnancies and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <15 | 15-17 | 18-19 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | >44 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Estimated pregnancies** | 216 | 4,598 | 9,404 | 14,002 | 40,060 | 55,120 | 48,271 | 23,111 | 5,290 | 355 | 186,427 |
| **Women** | 330,472 | 210,932 | 140,397 | 351,329 | 367,550 | 366,464 | 355,677 | 362,132 | 405,501 | 410,599 | 2,619,252 |
| **Rate (per 1,000 women)** | 0.7 | 21.8 | 67.0 | 39.9 | 109.0 | 150.4 | 135.7 | 63.8 | 13.0 | 0.9 | 71.2 |
| **Standard Error (SE)** | 0.04 | 0.32 | 0.67 | 0.33 | 0.51 | 0.59 | 0.57 | 0.41 | 0.18 | 0.05 | 0.16 |

Table 3.1.1.3 Estimated Pregnancies and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Estimated pregnancies** | 8,545 | 5,684 | 70,500 | 16,480 | 4,112 | 56,024 | 10,198 | 8,966 | 5,921 | 186,425 |
| **Women 15-49** | 114,014 | 76,283 | 993,644 | 227,771 | 79,086 | 819,860 | 134,053 | 108,945 | 65,423 | 2,619,252 |
| **Rate (per 1,000 women 15-49)** | 74.9 | 74.5 | 71.0 | 72.4 | 52.0 | 68.3 | 76.1 | 82.3 | 90.5 | 71.2 |
| **Standard Error (SE)** | 0.78 | 0.95 | 0.26 | 0.54 | 0.79 | 0.28 | 0.72 | 0.83 | 1.12 | 0.16 |

**Source:** Vital Statistics, Birth and Stillbirth Files, Service Alberta, May & August 2008 releases
Fee-for-Services Claims Files, Alberta Health and Wellness
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness

**Notes:** Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases
Totals for age groups and RHAs include unknown ages or RHAs
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.1.1.4 Estimated Pregnancies and Rate by Year and Maternal Age Group, Alberta, 1998 to 2007

| Estimated pregnancies | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 94 | 75 | 69 | 76 | 80 | 66 | 68 | 57 | 69 | 90 |
| 15-17 | 1,972 | 1,904 | 1,697 | 1,624 | 1,480 | 1,459 | 1,430 | 1,424 | 1,555 | 1,619 |
| 18-19 | 3,439 | 3,301 | 3,365 | 3,341 | 3,244 | 3,063 | 3,009 | 3,054 | 3,087 | 3,263 |
| 15-19 | 5,411 | 5,205 | 5,062 | 4,965 | 4,724 | 4,522 | 4,439 | 4,478 | 4,642 | 4,882 |
| 20-24 | 11,799 | 11,976 | 11,783 | 11,785 | 12,241 | 12,613 | 12,502 | 12,520 | 13,428 | 14,112 |
| 25-29 | 15,072 | 15,038 | 14,766 | 14,774 | 15,287 | 15,920 | 16,441 | 16,966 | 18,260 | 19,894 |
| 30-34 | 12,932 | 12,805 | 12,502 | 13,032 | 13,640 | 14,214 | 14,545 | 14,974 | 16,040 | 17,257 |
| 35-39 | 5,949 | 6,227 | 6,239 | 6,314 | 6,489 | 6,638 | 6,739 | 7,035 | 7,622 | 8,454 |
| 40-44 | 1,179 | 1,302 | 1,334 | 1,344 | 1,424 | 1,649 | 1,613 | 1,685 | 1,681 | 1,924 |
| >44 | 91 | 90 | 47 | 84 | 89 | 95 | 95 | 99 | 133 | 123 |
| All | 52,542 | 52,721 | 51,802 | 52,375 | 53,975 | 55,720 | 56,445 | 57,815 | 61,875 | 66,740 |

| Rate (per 1,000 women 15-49) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 0.9 | 0.7 | 0.6 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 | 0.6 | 0.8 |
| 15-17 | 31.6 | 29.5 | 25.9 | 24.4 | 21.9 | 21.6 | 21.0 | 20.6 | 22.0 | 22.7 |
| 18-19 | 86.8 | 80.6 | 78.8 | 75.3 | 71.3 | 66.7 | 65.1 | 65.9 | 66.7 | 68.3 |
| 15-19 | 53.0 | 49.3 | 46.8 | 44.7 | 41.8 | 39.9 | 38.8 | 38.8 | 39.7 | 41.0 |
| 20-24 | 119.9 | 117.3 | 113.8 | 110.5 | 110.8 | 110.7 | 107.2 | 105.7 | 110.0 | 111.1 |
| 25-29 | 144.7 | 142.2 | 139.3 | 138.3 | 139.3 | 142.8 | 144.5 | 146.0 | 150.4 | 154.4 |
| 30-34 | 112.8 | 113.6 | 112.6 | 116.3 | 120.2 | 124.1 | 126.9 | 129.8 | 136.4 | 140.5 |
| 35-39 | 44.7 | 46.5 | 47.1 | 48.7 | 51.4 | 54.3 | 56.6 | 59.7 | 63.4 | 68.2 |
| 40-44 | 9.6 | 10.2 | 10.2 | 10.0 | 10.4 | 11.9 | 11.6 | 12.3 | 12.4 | 14.5 |
| >44 | 0.9 | 0.9 | 0.4 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 1.0 | 0.9 |
| All | 67.9 | 66.6 | 64.6 | 64.2 | 64.9 | 66.3 | 66.6 | 67.7 | 71.1 | 74.6 |

Table 3.1.1.5 Estimated Pregnancies and Rate by Year and Residence RHA, Alberta, 1998 to 2007

| Estimated pregnancies | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 2,596 | 2,629 | 2,462 | 2,472 | 2,499 | 2,618 | 2,658 | 2,648 | 2,851 | 3,046 |
| Palliser | 1,579 | 1,561 | 1,646 | 1,605 | 1,627 | 1,661 | 1,672 | 1,786 | 1,822 | 2,076 |
| Calgary | 19,033 | 19,214 | 19,234 | 19,341 | 19,990 | 21,084 | 21,253 | 22,009 | 23,334 | 25,157 |
| David Thompson | 4,636 | 4,720 | 4,631 | 4,669 | 4,825 | 4,941 | 5,042 | 5,082 | 5,537 | 5,861 |
| East Central | 1,339 | 1,267 | 1,220 | 1,202 | 1,314 | 1,210 | 1,304 | 1,275 | 1,378 | 1,459 |
| Capital | 16,117 | 16,113 | 15,755 | 15,980 | 16,361 | 16,786 | 17,060 | 17,188 | 18,566 | 20,270 |
| Aspen | 3,300 | 3,277 | 2,990 | 3,116 | 3,199 | 3,161 | 3,147 | 3,161 | 3,434 | 3,603 |
| Peace Country | 2,545 | 2,537 | 2,420 | 2,456 | 2,521 | 2,616 | 2,633 | 2,829 | 3,034 | 3,103 |
| Northern Lights | 1,393 | 1,397 | 1,440 | 1,528 | 1,637 | 1,641 | 1,673 | 1,837 | 1,919 | 2,165 |
| Alberta | 52,542 | 52,721 | 51,802 | 52,375 | 53,975 | 55,720 | 56,445 | 57,815 | 61,875 | 66,740 |

| Rate (per 1,000 women 15-49) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 70.8 | 70.8 | 65.8 | 66.0 | 66.7 | 69.7 | 70.6 | 70.4 | 75.4 | 79.0 |
| Palliser | 68.4 | 66.0 | 68.6 | 65.5 | 65.4 | 66.9 | 66.9 | 71.0 | 72.0 | 80.4 |
| Calgary | 67.9 | 66.4 | 65.3 | 64.1 | 64.5 | 67.1 | 66.8 | 68.2 | 70.6 | 73.9 |
| David Thompson | 68.0 | 67.7 | 65.5 | 65.0 | 66.1 | 67.2 | 68.0 | 68.2 | 73.3 | 75.5 |
| East Central | 52.2 | 49.3 | 47.2 | 46.1 | 49.9 | 46.0 | 49.8 | 48.7 | 52.7 | 54.5 |
| Capital | 65.5 | 64.2 | 62.2 | 62.2 | 62.5 | 63.5 | 64.2 | 64.3 | 68.3 | 72.3 |
| Aspen | 75.0 | 73.8 | 67.3 | 69.6 | 70.9 | 70.6 | 70.7 | 71.4 | 77.2 | 79.6 |
| Peace Country | 77.2 | 75.4 | 71.4 | 72.0 | 72.9 | 75.4 | 75.1 | 80.0 | 83.7 | 83.1 |
| Northern Lights | 81.6 | 80.2 | 81.0 | 83.5 | 85.0 | 81.9 | 81.2 | 87.2 | 89.1 | 94.9 |
| Alberta | 67.9 | 66.6 | 64.6 | 64.2 | 64.9 | 66.3 | 66.6 | 67.7 | 71.1 | 74.6 |

**Source**: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May & August 2008 releases
Fee-for-Services Claims Files, Alberta Health and Wellness
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness

**Notes**: Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.1.1.6 Estimated Pregnancy Rate (per 1,000 women) by Residence RHA and Maternal Age Group, Alberta, 2005 to 2007

| 2005 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 0.4 | 0.6 | 0.4 | 0.8 | 0.5 | 0.4 | 0.4 | 1.3 | 1.3 | 0.5 |
| 15-17 | 23.0 | 19.3 | 16.8 | 27.4 | 9.9 | 19.8 | 24.2 | 31.9 | 37.9 | 20.6 |
| 18-19 | 56.1 | 71.7 | 53.7 | 81.0 | 42.0 | 64.0 | 97.7 | 93.8 | 103.1 | 65.9 |
| 15-19 | 36.5 | 40.3 | 31.3 | 49.3 | 22.4 | 37.8 | 53.2 | 57.3 | 64.5 | 38.8 |
| 20-24 | 122.6 | 132.1 | 90.4 | 127.3 | 85.0 | 95.4 | 145.8 | 150.9 | 169.7 | 105.7 |
| 25-29 | 161.3 | 172.9 | 133.9 | 176.0 | 139.3 | 137.5 | 175.9 | 177.6 | 183.2 | 146.0 |
| 30-34 | 127.0 | 115.5 | 143.5 | 108.2 | 97.8 | 126.7 | 110.3 | 125.7 | 118.4 | 129.8 |
| 35-39 | 54.0 | 45.1 | 73.3 | 42.8 | 34.8 | 56.7 | 44.0 | 44.4 | 49.3 | 59.7 |
| 40-44 | 9.9 | 8.2 | 15.6 | 6.7 | 4.7 | 12.3 | 10.0 | 8.7 | 9.0 | 12.3 |
| >44 | 0.5 | 0.5 | 1.1 | 0.3 | 0.5 | 0.6 | 0.6 | 0.6 | 0.3 | 0.7 |
| All | 70.4 | 71.0 | 68.2 | 68.2 | 48.7 | 64.3 | 71.4 | 80.0 | 87.2 | 67.7 |

| 2006 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 0.5 | 1.5 | 0.5 | 0.8 | 0.3 | 0.7 | 0.9 | 0.6 | 0.3 | 0.6 |
| 15-17 | 18.1 | 14.3 | 18.8 | 28.5 | 17.4 | 21.7 | 31.7 | 28.6 | 34.7 | 22.0 |
| 18-19 | 58.2 | 75.3 | 53.0 | 81.8 | 49.4 | 64.7 | 102.2 | 101.3 | 99.5 | 66.7 |
| 15-19 | 34.0 | 38.7 | 32.2 | 50.3 | 29.7 | 38.9 | 58.8 | 57.4 | 60.6 | 39.7 |
| 20-24 | 128.9 | 136.8 | 92.9 | 138.3 | 92.7 | 98.5 | 149.3 | 160.3 | 165.8 | 110.0 |
| 25-29 | 180.1 | 178.1 | 136.8 | 176.8 | 143.1 | 141.3 | 194.4 | 188.9 | 171.5 | 150.4 |
| 30-34 | 137.8 | 113.4 | 146.7 | 122.9 | 94.2 | 136.3 | 124.7 | 121.1 | 130.4 | 136.4 |
| 35-39 | 51.0 | 36.5 | 77.0 | 40.9 | 43.3 | 63.1 | 43.9 | 45.1 | 61.7 | 63.4 |
| 40-44 | 10.8 | 7.7 | 15.4 | 8.9 | 5.3 | 12.4 | 8.1 | 7.8 | 13.2 | 12.4 |
| >44 | 0.7 | 0.8 | 1.2 | 1.0 | 0.7 | 0.8 | 0.6 | 0.8 | 1.0 | 1.0 |
| All | 75.4 | 72.0 | 70.6 | 73.3 | 52.7 | 68.3 | 77.2 | 83.7 | 89.1 | 71.1 |

| 2007 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 1.3 | 1.5 | 0.5 | 0.6 | 0.5 | 0.9 | 1.3 | 0.8 | 2.3 | 0.8 |
| 15-17 | 23.3 | 24.7 | 18.9 | 24.9 | 11.2 | 21.6 | 38.7 | 31.4 | 39.1 | 22.7 |
| 18-19 | 72.7 | 85.3 | 56.5 | 80.7 | 50.5 | 62.9 | 94.6 | 106.2 | 114.1 | 68.3 |
| 15-19 | 43.3 | 49.3 | 33.9 | 47.5 | 26.3 | 38.4 | 60.3 | 60.9 | 70.0 | 41.0 |
| 20-24 | 134.8 | 145.4 | 94.8 | 133.8 | 104.8 | 99.5 | 150.7 | 149.5 | 169.3 | 111.1 |
| 25-29 | 173.1 | 191.8 | 138.7 | 178.6 | 147.1 | 150.3 | 193.1 | 179.2 | 184.4 | 154.4 |
| 30-34 | 136.7 | 120.3 | 152.1 | 127.8 | 94.7 | 140.7 | 124.5 | 120.7 | 132.6 | 140.5 |
| 35-39 | 53.9 | 48.2 | 81.6 | 49.6 | 33.5 | 68.6 | 49.8 | 47.7 | 61.2 | 68.2 |
| 40-44 | 14.3 | 8.1 | 17.6 | 9.1 | 9.0 | 14.4 | 8.6 | 12.4 | 14.8 | 14.5 |
| >44 | 0.8 | 0.5 | 1.1 | 0.6 | 0.4 | 0.8 | 0.7 | 0.4 | 1.0 | 0.9 |
| All | 79.0 | 80.4 | 73.9 | 75.5 | 54.5 | 72.3 | 79.6 | 83.1 | 94.9 | 74.6 |

**Source**: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May & August 2008 releases.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

**Notes**: Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

# *3. Pregnancies*

## *3.2 Spontaneous Abortions*

Alberta Perinatal Health Program

Alberta Reproductive Health
Pregnancies and Births 2009

Government
of Alberta

## 3.2.1 Spontaneous Abortions

Spontaneous abortion (miscarriage): *Naturally occurring premature expulsion from the uterus of the products of conception – of the embryo, or of a nonviable fetus* (Dorland, 2000). In Alberta, the legal definition of spontaneous abortions refers to those occurring prior to 20 weeks gestation. Included in this category are clinical spontaneous abortions treated by physicians, excluding unreported or undetected spontaneous abortions. A two-month time lag between physician visits was used as the cutoff point for separate pregnancy events.

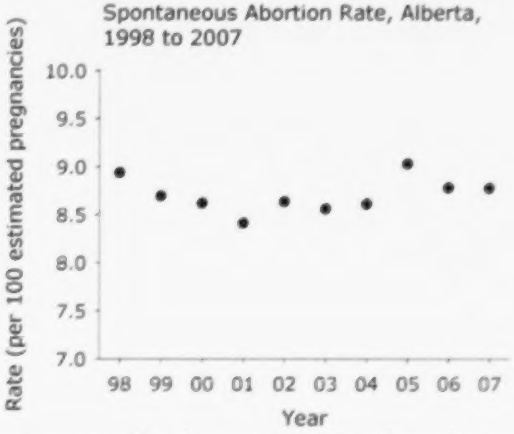
Spontaneous abortion rate: *Number of spontaneous abortions [illegible] per 1,000 women aged 15-49, or per 100 estimated pregnancies.*

The likelihood of conceiving during a single menstrual cycle is about 30 percent. About 50 to 60 percent of those conceptions last beyond 20 weeks gestation (Norwitz, Schust, & Fisher, 2001). The majority (50 – 65%) of spontaneous abortions result from chromosomal abnormalities (Reindollar, 2000).

Known risk factors for spontaneous abortion include advanced maternal age, previous history of spontaneous abortion, and uterine malformations (Andersen, Wohlfahrt, Christens et al., 2000; de la Rochebrochard & Thonneau, 2002; Garcia-Enguidanos et al., 2002).

### Time Trends (see Table 3.2.1.1)

- The spontaneous abortion rate (per 1,000 women 15-49) fell to a low in 2001 and increased to 2007, following the same time trend as the estimated pregnancy rate. In 2007, the spontaneous abortion rate was 6.5 (per 1,000 women 15-49).



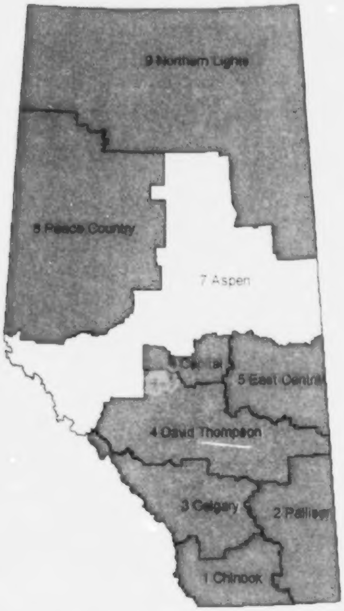
- The spontaneous abortion rate (per 100 estimated pregnancies) was stable over time from 1998 to 2007. In 2007, the rate was 8.8.

### Maternal Age Effects (see Tables 3.2.1.2, 3.2.1.4)

- Spontaneous abortion rates for women under 15 and over 44 years are not reliable due to low numbers of spontaneous abortions in these age groups; these rates must be interpreted with caution.
- The highest rates of spontaneous abortion (per 1,000 women) occur in those age groups with high rates of estimated pregnancy. The highest rate for 2005 to 2007 combined was 12.4, for 25 to 29 year old mothers.

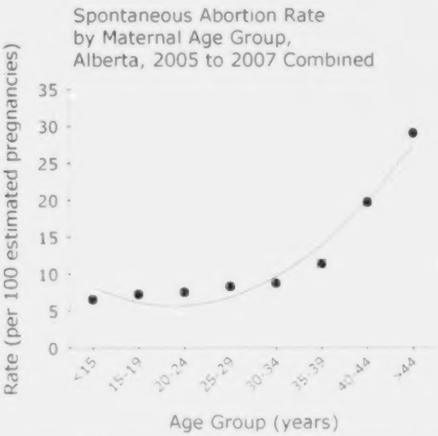
# 3.2.1 Spontaneous Abortions

Spontaneous Abortion Rate (per 100 estimated pregnancies), 2005-07 Combined



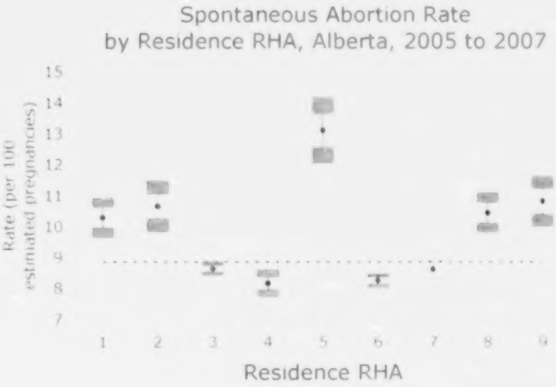
9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

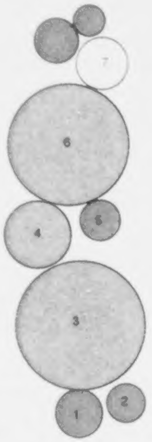
## Maternal Age Effects continued (see Tables 3.2.1.2, 3.2.1.4.)



- The spontaneous abortion rate (per 100 estimated pregnancies) was under 9% for women up to age 35 for 2005 to 2007 combined. The rate increases notably with maternal age over 35; for women 45 and older, the rate is more than three times higher than women under 35.

## Regional Data (see Tables 3.2.1.3, 3.2.15)





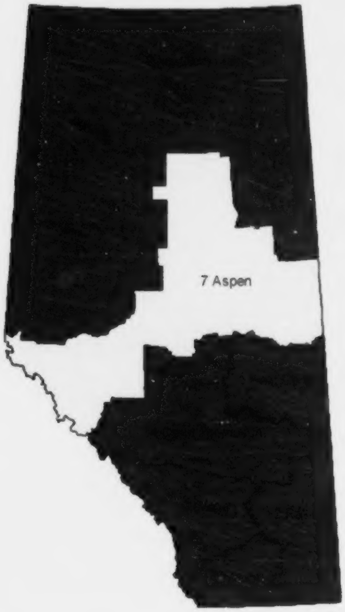
- The spontaneous abortion rate (per 100 estimated pregnancies) was significantly lower than the provincial average in RHAs 3, 4, and 6, and higher than the provincial average in RHAs 1, 2, 5, 8, and 9 for 2005 to 2007 combined. The lowest rate was 8.2 (RHAs 4 and 6), while the highest rate was 13.1 (RHA 5).
- The spontaneous abortion rate (per 1,000 women aged 15-49) was significantly lower than the provincial average in RHAs 3, 4, and 6, and significantly higher than the provincial average in RHAs 1, 2, 8, and 9.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

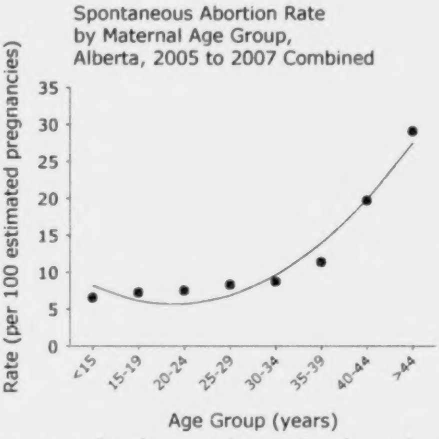
# 3.2.1 Spontaneous Abortions

About 1% of women suffer from recurrent (three or more consecutive) spontaneous abortions. Causes include chromosomal abnormalities, thrombophilia (increased tendency to form internal blood clots), metabolic disorders (e.g., hormonal disorders), anatomical abnormalities, infection, and immune system factors (Horne and Alexander, 2005; Kalumbi, Farquharson and Quenby, 2005).

Spontaneous Abortion Rate (per 100 estimated pregnancies), 2005-07 Combined

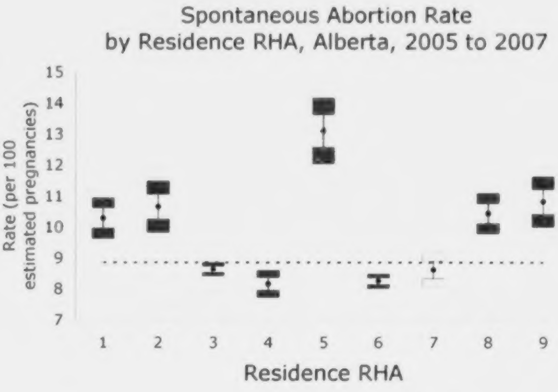


## Maternal Age Effects continued (see Tables 3.2.1.2, 3.2.1.4,)



- The spontaneous abortion rate (per 100 estimated pregnancies) was under 9% for women up to age 35 for 2005 to 2007 combined. The rate increases notably with maternal age over 35; for women 45 and older, the rate is more than three times higher than women under 35.

## Regional Data (see Tables 3.2.1.3, 3.2.15)



- The spontaneous abortion rate (per 100 estimated pregnancies) was significantly lower than the provincial average in RHAs 3, 4, and 6, and higher than the provincial average in RHAs 1, 2, 5, 8, and 9 for 2005 to 2007 combined. The lowest rate was 8.2 (RHAs 4 and 6), while the highest rate was 13.1 (RHA 5).
- The spontaneous abortion rate (per 1,000 women aged 15-49) was significantly lower than the provincial average in RHAs 3, 4, and 6, and significantly higher than the provincial average in RHAs 1, 2, 8, and 9.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

# 3.2.1 Spontaneous Abortions

## Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

A two-month time lag between repeat pregnancies was used as a cutoff point to define separate pregnancy events.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 spontaneous abortion data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.2.1.1 Spontaneous Abortions and Rates by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Spontaneous abortions** | 4,694 | 4,581 | 4,464 | 4,403 | 4,659 | 4,768 | 4,859 | 5,219 | 5,431 | 5,855 |
| **Women 15-49** | 774,059 | 791,981 | 802,182 | 815,913 | 831,964 | 840,560 | 847,174 | 854,349 | 869,776 | 895,127 |
| **Rate (per 1,000 women 15-49)** | 6.1 | 5.8 | 5.6 | 5.4 | 5.6 | 5.7 | 5.7 | 6.1 | 6.2 | 6.5 |
| **Standard Error (SE)** | 0.09 | 0.09 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.09 |
| **Estimated pregnancies** | 52,542 | 52,721 | 51,802 | 52,375 | 53,975 | 55,720 | 56,445 | 57,815 | 61,875 | 66,740 |
| **Rate (per 100 estimated pregnancies)** | 8.9 | 8.7 | 8.6 | 8.4 | 8.6 | 8.6 | 8.6 | 9.0 | 8.8 | 8.8 |
| **Standard Error (SE)** | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.11 | 0.11 |

Table 3.2.1.2 Spontaneous Abortions and Rates by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <15[1] | 15-17 | 18-19 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | >44[1] | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Spontaneous abortions** | 14 | 314 | 691 | 1,005 | 2,986 | 4,546 | 4,193 | 2,619 | 1,039 | 103 | 16,505 |
| **Women** | 330,472 | 210,932 | 140,397 | 351,329 | 367,550 | 366,464 | 355,677 | 362,132 | 405,501 | 410,599 | 2,619,252 |
| **Rate (per 1,000 women)** | 0.0 | 1.5 | 4.9 | 2.9 | 8.1 | 12.4 | 11.8 | 7.2 | 2.6 | 0.3 | 6.3 |
| **Standard Error (SE)** | 0.01 | 0.08 | 0.19 | 0.09 | 0.15 | 0.18 | 0.18 | 0.14 | 0.08 | 0.02 | 0.05 |
| **Estimated pregnancies** | 216 | 4,598 | 9,404 | 14,002 | 40,060 | 55,120 | 48,271 | 23,111 | 5,290 | 355 | 186,425 |
| **Rate (per 100 estimated pregnancies)** | 6.5 | 6.8 | 7.3 | 7.2 | 7.5 | 8.2 | 8.7 | 11.3 | 19.6 | 29.0 | 8.9 |
| **Standard Error (SE)** | 1.68 | 0.37 | 0.27 | 0.22 | 0.13 | 0.12 | 0.13 | 0.21 | 0.55 | 2.41 | 0.07 |

Table 3.2.1.3 Spontaneous Abortions and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Spontaneous abortions** | 877 | 604 | 6077 | 1343 | 538 | 4616 | 877 | 934 | 639 | 16,505 |
| **Women 15-49** | 114,014 | 76,283 | 993,644 | 227,771 | 79,086 | 819,860 | 134,053 | 108,945 | 65,423 | 2,619,252 |
| **Rate (per 1,000 women 15-49)** | 7.7 | 7.9 | 6.1 | 5.9 | 6.8 | 5.6 | 6.5 | 8.6 | 9.8 | 6.3 |
| **Standard Error (SE)** | 0.26 | 0.32 | 0.08 | 0.16 | 0.29 | 0.08 | 0.22 | 0.28 | 0.38 | 0.05 |
| **Estimated pregnancies** | 8,533 | 5,672 | 70,445 | 16,456 | 4,107 | 55,956 | 10,179 | 8,952 | 5,909 | 186,425 |
| **Rate (per 100 estimated pregnancies)** | 10.3 | 10.6 | 8.6 | 8.2 | 13.1 | 8.2 | 8.6 | 10.4 | 10.8 | 8.9 |
| **Standard Error (SE)** | 0.33 | 0.41 | 0.11 | 0.21 | 0.53 | 0.12 | 0.28 | 0.32 | 0.40 | 0.07 |

**Sources** Vital Statistics, Birth File, Service Alberta, May 2008 release
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release
Fee-for-Services Claims Files, Alberta Health and Wellness
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness

**Notes** 1 The age-specific rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 44-49 age groups, respectively
Totals for age groups and RHAs include unknown ages or RHAs
Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.2.1.4 Spontaneous Abortions and Rate by Year and Maternal Age Group, Alberta, 1998 to 2007

| Spontaneous abortions | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 9 | 7 | 9 | 12 | 15 | 7 | 11 | 2 | 4 | 8 |
| 15-17 | 154 | 157 | 140 | 124 | 115 | 99 | 101 | 110 | 94 | 110 |
| 18-19 | 285 | 239 | 261 | 239 | 254 | 238 | 219 | 252 | 227 | 212 |
| 15-19 | 439 | 396 | 401 | 363 | 369 | 337 | 320 | 362 | 321 | 322 |
| 20-24 | 923 | 871 | 888 | 838 | 918 | 898 | 931 | 979 | 953 | 1,054 |
| 25-29 | 1,243 | 1,218 | 1,179 | 1,140 | 1,211 | 1,262 | 1,263 | 1,450 | 1,553 | 1,543 |
| 30-34 | 1,105 | 1,096 | 1,030 | 1,050 | 1,135 | 1,206 | 1,271 | 1,276 | 1,392 | 1,525 |
| 35-39 | 681 | 700 | 694 | 743 | 739 | 725 | 753 | 785 | 855 | 979 |
| 40-44 | 257 | 264 | 250 | 233 | 245 | 310 | 278 | 338 | 315 | 386 |
| >44 | 37 | 29 | 13 | 24 | 27 | 23 | 32 | 27 | 38 | 38 |
| Total | 4,694 | 4,581 | 4,464 | 4,403 | 4,659 | 4,768 | 4,859 | 5,219 | 5,431 | 5,855 |

| Rate (per 1,000 women) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 |
| 15-17 | 2.5 | 2.4 | 2.1 | 1.9 | 1.7 | 1.5 | 1.5 | 1.6 | 1.3 | 1.5 |
| 18-19 | 7.2 | 5.8 | 6.1 | 5.4 | 5.6 | 5.2 | 4.7 | 5.4 | 4.9 | 4.4 |
| 15-19 | 4.3 | 3.8 | 3.7 | 3.3 | 3.3 | 3.0 | 2.8 | 3.1 | 2.7 | 2.7 |
| 20-24 | 9.4 | 8.5 | 8.6 | 7.9 | 8.3 | 7.9 | 8.0 | 8.3 | 7.8 | 8.3 |
| 25-29 | 11.9 | 11.5 | 11.1 | 10.7 | 11.0 | 11.3 | 11.1 | 12.5 | 12.8 | 12.0 |
| 30-34 | 9.6 | 9.7 | 9.3 | 9.4 | 10.0 | 10.5 | 11.1 | 11.1 | 11.8 | 12.4 |
| 35-39 | 5.1 | 5.2 | 5.2 | 5.7 | 5.8 | 5.9 | 6.3 | 6.7 | 7.1 | 7.9 |
| 40-44 | 2.1 | 2.1 | 1.9 | 1.7 | 1.8 | 2.2 | 2.0 | 2.5 | 2.3 | 2.9 |
| >44 | 0.4 | 0.3 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 |
| Total | 6.1 | 5.8 | 5.6 | 5.4 | 5.6 | 5.7 | 5.7 | 6.1 | 6.2 | 6.5 |

| Rate (per 100 estimated pregnancies) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 9.6 | 9.3 | 13.0 | 15.8 | 18.8 | 10.6 | 16.2 | 3.5 | 5.8 | 8.9 |
| 15-17 | 7.8 | 8.2 | 8.2 | 7.6 | 7.8 | 6.8 | 7.1 | 7.7 | 6.0 | 6.8 |
| 18-19 | 8.3 | 7.2 | 7.8 | 7.2 | 7.8 | 7.8 | 7.3 | 8.3 | 7.4 | 6.5 |
| 15-19 | 8.1 | 7.6 | 7.9 | 7.3 | 7.8 | 7.5 | 7.2 | 8.1 | 6.9 | 6.6 |
| 20-24 | 7.8 | 7.3 | 7.5 | 7.1 | 7.5 | 7.1 | 7.4 | 7.8 | 7.1 | 7.5 |
| 25-29 | 8.2 | 8.1 | 8.0 | 7.7 | 7.9 | 7.9 | 7.7 | 8.5 | 8.5 | 7.8 |
| 30-34 | 8.5 | 8.6 | 8.2 | 8.1 | 8.3 | 8.5 | 8.7 | 8.5 | 8.7 | 8.8 |
| 35-39 | 11.4 | 11.2 | 11.1 | 11.8 | 11.4 | 10.9 | 11.2 | 11.2 | 11.2 | 11.6 |
| 40-44 | 21.8 | 20.3 | 18.7 | 17.3 | 17.2 | 18.8 | 17.2 | 20.1 | 18.7 | 20.1 |
| >44 | 40.7 | 32.2 | 27.7 | 28.6 | 30.3 | 24.2 | 33.7 | 27.3 | 28.6 | 30.9 |
| Total | 9.0 | 8.7 | 8.6 | 8.4 | 8.6 | 8.6 | 8.6 | 9.0 | 8.8 | 8.8 |

**Sources**: Vital Statistics, Birth File, Service Alberta, May 2008 release
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release
Fee-for-Services Claims Files, Alberta Health and Wellness
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness

**Notes**: 1. The age-specific rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 44-49 age groups, respectively
Totals for age groups include unknown ages or RHAs
Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.2.1.5 Spontaneous Abortions and Rate by Year and Residence RHA, Alberta, 1998 to 2007

| **Spontaneous abortions** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Chinook** | 312 | 248 | 223 | 213 | 238 | 236 | 258 | 261 | 299 | 317 |
| **Palliser** | 135 | 141 | 159 | 147 | 160 | 174 | 173 | 208 | 192 | 204 |
| **Calgary** | 1,664 | 1,678 | 1,551 | 1,554 | 1,654 | 1,885 | 1,848 | 1,926 | 2,023 | 2,128 |
| **David Thompson** | 402 | 400 | 409 | 417 | 418 | 397 | 414 | 446 | 420 | 477 |
| **East Central** | 139 | 135 | 128 | 137 | 137 | 131 | 162 | 178 | 176 | 184 |
| **Capital** | 1,364 | 1,299 | 1,343 | 1,322 | 1,330 | 1,314 | 1,330 | 1,404 | 1,504 | 1,708 |
| **Aspen** | 280 | 287 | 280 | 273 | 302 | 265 | 255 | 257 | 306 | 314 |
| **Peace Country** | 276 | 258 | 243 | 224 | 257 | 243 | 281 | 337 | 315 | 282 |
| **Northern Lights** | 122 | 135 | 128 | 116 | 163 | 123 | 138 | 202 | 196 | 241 |
| **Alberta** | 4,694 | 4,581 | 4,464 | 4,403 | 4,659 | 4,768 | 4,859 | 5,219 | 5,431 | 5,855 |

| **Rate (per 1,000 women 15-49)** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Chinook** | 8.5 | 6.7 | 6.0 | 5.7 | 6.4 | 6.3 | 6.9 | 6.9 | 7.9 | 8.2 |
| **Palliser** | 5.8 | 6.0 | 6.6 | 6.0 | 6.4 | 7.0 | 6.9 | 8.3 | 7.6 | 7.9 |
| **Calgary** | 5.9 | 5.8 | 5.3 | 5.1 | 5.3 | 6.0 | 5.8 | 6.0 | 6.1 | 6.3 |
| **David Thompson** | 5.9 | 5.7 | 5.8 | 5.8 | 5.7 | 5.4 | 5.6 | 6.0 | 5.6 | 6.1 |
| **East Central** | 5.4 | 5.2 | 5.0 | 5.3 | 5.2 | 5.0 | 6.2 | 6.8 | 6.7 | 6.9 |
| **Capital** | 5.5 | 5.2 | 5.3 | 5.1 | 5.1 | 5.0 | 5.0 | 5.2 | 5.5 | 6.1 |
| **Aspen** | 6.4 | 6.5 | 6.3 | 6.1 | 6.7 | 5.9 | 5.7 | 5.8 | 6.9 | 6.9 |
| **Peace Country** | 8.4 | 7.7 | 7.2 | 6.6 | 7.4 | 7.0 | 8.0 | 9.5 | 8.7 | 7.6 |
| **Northern Lights** | 7.1 | 7.8 | 7.2 | 6.3 | 8.5 | 6.1 | 6.7 | 9.6 | 9.1 | 10.6 |
| **Alberta** | 6.1 | 5.8 | 5.6 | 5.4 | 5.6 | 5.7 | 5.7 | 6.1 | 6.2 | 6.5 |

| **Rate (per 100 estimated pregnancies)** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Chinook** | 12.0 | 9.4 | 9.1 | 8.6 | 9.5 | 9.0 | 9.7 | 9.9 | 10.5 | 10.4 |
| **Palliser** | 8.6 | 9.0 | 9.7 | 9.2 | 9.8 | 10.5 | 10.4 | 11.7 | 10.6 | 9.9 |
| **Calgary** | 8.8 | 8.7 | 8.1 | 8.0 | 8.3 | 8.9 | 8.7 | 8.8 | 8.7 | 8.5 |
| **David Thompson** | 8.7 | 8.5 | 8.8 | 8.9 | 8.7 | 8.0 | 8.2 | 8.8 | 7.6 | 8.1 |
| **East Central** | 10.4 | 10.7 | 10.5 | 11.4 | 10.4 | 10.8 | 12.4 | 14.0 | 12.8 | 12.6 |
| **Capital** | 8.5 | 8.1 | 8.5 | 8.3 | 8.1 | 7.8 | 7.8 | 8.2 | 8.1 | 8.4 |
| **Aspen** | 8.5 | 8.8 | 9.4 | 8.8 | 9.5 | 8.4 | 8.1 | 8.1 | 8.9 | 8.7 |
| **Peace Country** | 10.9 | 10.2 | 10.0 | 9.2 | 10.2 | 9.3 | 10.7 | 11.9 | 10.4 | 9.1 |
| **Northern Lights** | 8.8 | 9.7 | 8.9 | 7.6 | 10.0 | 7.5 | 8.3 | 11.0 | 10.2 | 11.2 |
| **Alberta** | 9.0 | 8.7 | 8.6 | 8.4 | 8.6 | 8.6 | 8.6 | 9.0 | 8.8 | 8.8 |

**Sources**: Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

**Notes:** Totals for RHAs include unknown RHAs.
Data include Alberta residents only, with the exception of spontaneous abortion data prior to 2000, which may contain 'out of province' cases.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

# *3. Pregnancies*

## *3.3 Reproductive Care Services*

*3.3.1 Induced abortions*
*3.3.2 Labour induction*
*3.3.3 Deliveries*

## 3.3.1 Induced Abortions

Induced abortion: *Intentional premature expulsion from the uterus of the products of conception – of the embryo, or of a nonviable fetus* (Dorland, 2000).

Induced abortion rate: *Number of induced abortions per 1,000 women aged 15-49, or per 100 estimated pregnancies.*

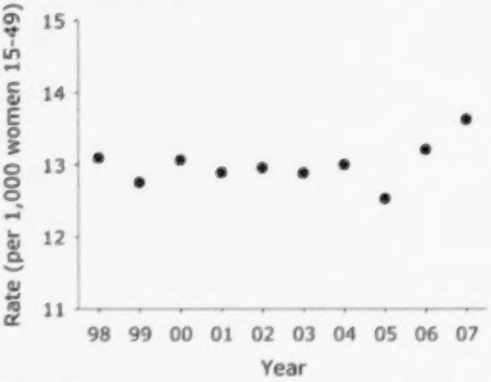
Abortions can be induced surgically or medically. Surgical abortions involve the use of instruments, including manual vacuum aspiration (up to eight weeks after the last menstrual period), suction curettage (six to 14 weeks), or dilation and evacuation (14-20 weeks). Medical abortions involve the use of drugs (methotrexate and misoprostol), and are usually done up to seven weeks after the last menstrual period (Sunnybrook and Women's College Health Sciences Centre, 2005).

In Alberta, induced abortions can be obtained in clinics or in hospitals. Clinics have been operating in Alberta since 1991, and the majority of induced abortions now occur in clinics.

Women who have induced abortions tend to be young (18 to 24 years) and in the very early stages of pregnancy (12 weeks or less) (Statistics Canada, 2006; Grimes & Creinin, 2004). Women having repeat induced abortions tend to be older, more likely to be using oral contraceptives, more likely to report physical abuse by a male partner, and more likely to report a history of sexual abuse or sexual violence than women having their first induced abortion (Fisher et al., 2005).

### Time Trends (see Table 3.3.1.1, 3.3.1.4, 3.3.1.5)

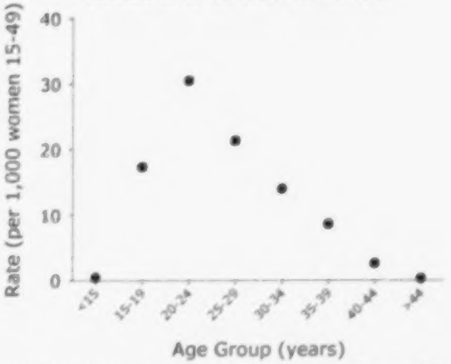
**Induced Abortion Rate, Alberta, 1998 to 2007**



- The induced abortion rate (per 1,000 women 15-49) did not vary significantly with time between 1998 and 2007. In 2007, the rate was 13.6.
- The induced abortion rate (per 100 estimated pregnancies) increased in 2000 and then decreased to 2007. In 2007, 18.3% of estimated pregnancies ended in induced abortion.
- The proportion of induced abortions occurring in private clinics (rather than acute care hospitals) increased steadily from 1998 to 2007. In 2007, 70.3% of induced abortions in Alberta occurred in clinics.
- In 2007, 52.3% of induced abortions occurred in Calgary, 46.2% in Edmonton, and 1.5% elsewhere in the province.

### Maternal Age Effects (see Tables 3.3.1.2, 3.3.1.9)

**Induced Abortion Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined**



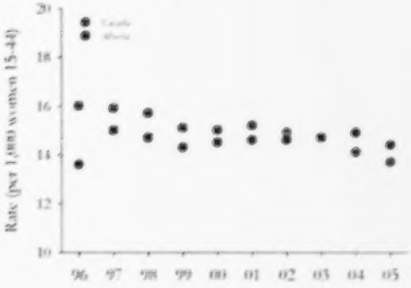
- The induced abortion rate (per 1,000 women) was highest for women between 20 and 24 years of age for 2005 to 2007 combined. During this time period, 30.5 out of every 1,000 women 20-24 years old obtained an induced abortion.

## 3.3.1 Induced Abortions

In 2005, there were 13.7 abortions for every 1,000 women aged 15 to 44 residing in Canada. The Alberta rate was 14.4. While the rate has been stable in Alberta over several years, the Canadian rate has declined slowly and was significantly lower than the Albertan rate in 2005. Rates were highest in the 20 to 24 year age group in Alberta and in Canada as a whole (Statistics Canada, 2007).

Induced Abortion Rate, Canada and Alberta, 1996 to 2005

Source: Statistics Canada (2007b)



In 2005, induced abortion rates (per 100 live births) were higher in Canada than in Alberta in young women, particularly in women under 15 years (Statistics Canada, 2007).

### **Maternal Age Effects** continued (see Tables 3.3.1.2, 3.3.1.9)

- The induced abortion rate (per 100 estimated pregnancies), was highest for women under 15 years between 2005 and 2007; 63.4% of pregnancies in this age group ended in induced abortion. The rate declined to a low of 10.3% in women 30 to 34 years old, and then increased to 29.6% for women over 44 years old.

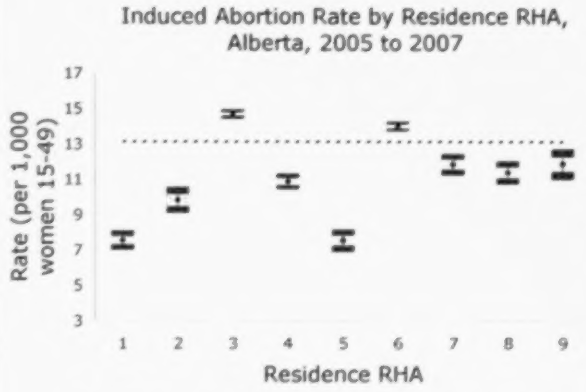
### **Gestational Age Data** (see Tables 3.3.1.6, 3.3.1.7, 3.3.1.8)

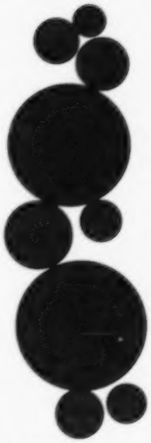
- In 2007, 84.9% of induced abortions occurred before 13 weeks gestation, and 14.5% occurred between 13 and 20 weeks gestation.
- Induced abortions in acute care hospitals occurred prior to 13 weeks 81.1% of the time in 2007, compared with 86.4% in private clinics.
- Younger women tend to have induced abortions at later gestational ages than older women. For example, in 2007, 32.8% of induced abortions in women 15 to 19 occurred prior to 9 weeks gestation, compared to 47.5% of induced abortions in women 35 to 39 years old.

## 3.3.1 Induced Abortions

Induced Abortion Rate (per 1,000 women 15-49), 2005-07 Combined

## Regional Data (see Tables 3.3.1.3, 3.3.1.5, 3.3.1.10)





- For 2005 to 2007 combined, induced abortion rates (per 1,000 women 15-49) were significantly higher than the provincial mean in Calgary (RHA 3) and Capital (RHA 6) health regions, and significantly lower than the provincial mean in all other RHAs. As with any medical service, access affects the rate of use, and induced abortion services are clustered in Edmonton and Calgary.
- The same pattern occurred in the rate per 100 estimated pregnancies.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

### Limitations and Methodology Notes

Induced abortion case identification procedures were updated for this edition of the report. Notably, the use of both diagnostic and billing codes for the Fee-for-Service database analyses resulted in greater case ascertainment than in past reports (for which billing codes were not used). The result is a larger reported number of induced abortion events in this edition of the report, compared with previous editions.

Detailed criteria for data extraction are provided in Appendix 6.1.1.

A two-month time lag between repeat pregnancies was used as a cutoff point to define separate pregnancy events.

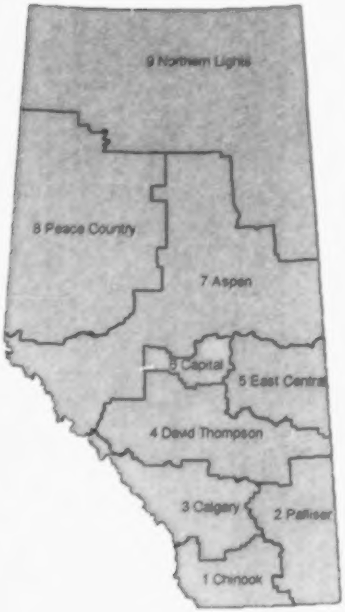
Totals for facility and gestational age analyses differ from those for other analyses due to use of a different database.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 induced abortion data to data from prior years due to changes in data coding systems.

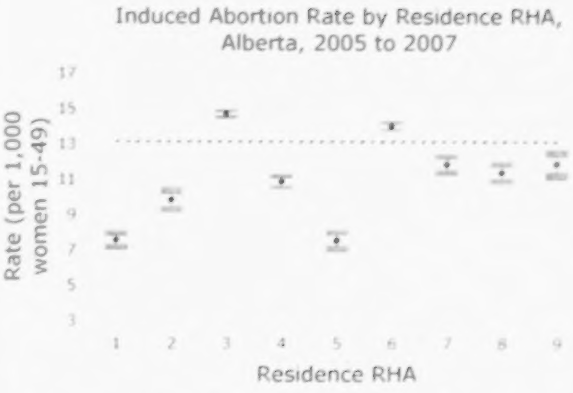
See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

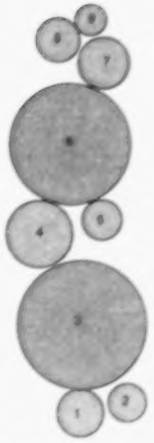
# 3.3.1 Induced Abortions

Induced Abortion Rate (per 1,000 women 15-49), 2005-07 Combined



## Regional Data (see Tables 3.3.1.3, 3.3.1.5, 3.3.1.10)


Induced Abortion Rate by Residence RHA, Alberta, 2005 to 2007



- For 2005 to 2007 combined, induced abortion rates (per 1,000 women 15-49) were significantly higher than the provincial mean in Calgary (RHA 3) and Capital (RHA 6) health regions, and significantly lower than the provincial mean in all other RHAs. As with any medical service, access affects the rate of use, and induced abortion services are clustered in Edmonton and Calgary.
- The same pattern occurred in the rate per 100 estimated pregnancies.

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## Limitations and Methodology Notes

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Detailed criteria for data extraction are provided in Appendix 6.1.1.

A two-month time lag between repeat pregnancies was used as a cutoff point to define separate pregnancy events.

Totals for facility and gestational age analyses differ from those for other analyses due to use of a different database.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 induced abortion data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.3.1.1 Induced Abortions and Rates by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Induced abortions** | 10,131 | 10,095 | 10,476 | 10,511 | 10,774 | 10,825 | 11,008 | 10,700 | 11,486 | 12,195 |
| **Women 15-49** | 774,059 | 791,981 | 802,182 | 815,913 | 831,964 | 840,560 | 847,174 | 854,349 | 869,776 | 895,127 |
| **Rate (per 1,000 women 15-49)** | 13.1 | 12.7 | 13.1 | 12.9 | 13.0 | 12.9 | 13.0 | 12.5 | 13.2 | 13.6 |
| **Standard Error (SE)** | 0.13 | 0.13 | 0.13 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| **Estimated pregnancies** | 52,542 | 52,721 | 51,802 | 52,375 | 53,975 | 55,720 | 56,445 | 57,815 | 61,875 | 66,740 |
| **Rate (per 100 estimated pregnancies)** | 19.3 | 19.1 | 20.2 | 20.1 | 20.0 | 19.4 | 19.5 | 18.5 | 18.6 | 18.3 |
| **Standard Error (SE)** | 0.17 | 0.17 | 0.18 | 0.18 | 0.17 | 0.17 | 0.17 | 0.16 | 0.16 | 0.15 |

Table 3.3.1.2 Induced Abortions and Rates by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <15[1] | 15-17 | 18-19 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | >44[1] | Total[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Induced abortions** | 137 | 2,232 | 3,833 | 6,065 | 11,193 | 7,791 | 4,952 | 3,102 | 1,036 | 105 | 34,381 |
| **Women 15-49** | 330,472 | 210,932 | 140,397 | 351,329 | 367,550 | 366,464 | 355,677 | 362,132 | 405,501 | 410,599 | 2,619,252 |
| **Rate (per 1,000 women 15-49)** | 0.4 | 10.6 | 27.3 | 17.3 | 30.5 | 21.3 | 13.9 | 8.6 | 2.6 | 0.3 | 13.1 |
| **Standard Error (SE)** | 0.04 | 0.22 | 0.43 | 0.22 | 0.28 | 0.24 | 0.20 | 0.15 | 0.08 | 0.02 | 0.07 |
| **Estimated pregnancies** | 216 | 4,598 | 9,404 | 14,002 | 40,060 | 55,120 | 48,271 | 23,111 | 5,290 | 355 | 186,425 |
| **Rate (per 100 estimated pregnancies)** | 63.4 | 48.5 | 40.8 | 43.3 | 27.9 | 14.1 | 10.3 | 13.4 | 19.6 | 29.6 | 18.4 |
| **Standard Error (SE)** | 3.28 | 0.74 | 0.51 | 0.42 | 0.22 | 0.15 | 0.14 | 0.22 | 0.55 | 2.42 | 0.09 |

Table 3.3.1.3 Induced Abortions and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Induced abortions** | 861 | 750 | 14604 | 2479 | 596 | 11484 | 1589 | 1241 | 777 | 34,381 |
| **Women 15-49** | 114,014 | 76,283 | 993,644 | 227,771 | 79,086 | 819,860 | 134,053 | 108,945 | 65,423 | 2,619,252 |
| **Rate (per 1,000 women 15-49)** | 7.6 | 9.8 | 14.7 | 10.9 | 7.5 | 14.0 | 11.9 | 11.4 | 11.9 | 13.1 |
| **Standard Error (SE)** | 0.26 | 0.36 | 0.12 | 0.22 | 0.31 | 0.13 | 0.30 | 0.32 | 0.42 | 0.07 |
| **Estimated pregnancies** | 8,533 | 5,672 | 70,445 | 16,456 | 4,107 | 55,956 | 10,179 | 8,952 | 5,909 | 186,425 |
| **Rate (per 100 estimated pregnancies)** | 10.1 | 13.2 | 20.7 | 15.1 | 14.5 | 20.5 | 15.6 | 13.9 | 13.1 | 18.4 |
| **Standard Error (SE)** | 0.33 | 0.45 | 0.15 | 0.28 | 0.55 | 0.17 | 0.36 | 0.37 | 0.44 | 0.09 |

**Source** Vital Statistics, Birth and Stillbirth Files, Service Alberta, May 2008 release
Fee-for-Services Claims Files, Alberta Health and Wellness
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness

Notes 1 The age-specific rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 44-49 age groups, respectively
2 Total rate = total Induced abortions / number of women aged 15-49 x 1,000
Totals for age groups and RHAs include unknown ages or RHAs
Data include Alberta residents only, with the exception of spontaneous abortion data (included in estimated pregnancies) prior to 2000, which may contain 'out of province' cases
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.3.1.4 Induced Abortions by Year and Facility Type, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Induced abortions at acute care hospitals** | 6,053 | 5,904 | 5,895 | 5,447 | 5,169 | 4,800 | 4,894 | 3,868 | 3,445 | 3,534 |
| **Induced abortions at private clinics** | 4,293 | 4,260 | 4,522 | 5,142 | 5,377 | 5,730 | 5,907 | 6,659 | 7,857 | 8,359 |
| **Induced abortions at all facilities** | 10,346 | 10,164 | 10,417 | 10,589 | 10,546 | 10,530 | 10,801 | 10,527 | 11,302 | 11,893 |
| **Percent at hospitals** | 58.5 | 58.1 | 56.6 | 51.4 | 49.0 | 45.6 | 45.3 | 36.7 | 30.5 | 29.7 |
| **Percent at clinics** | 41.5 | 41.9 | 43.4 | 48.6 | 51.0 | 54.4 | 54.7 | 63.3 | 69.5 | 70.3 |

Table 3.3.1.5 Induced Abortions by Year and Facility Region, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Induced abortions in Edmonton** | 4,297 | 4,326 | 4,477 | 4,653 | 4,765 | 4,878 | 5,011 | 4,827 | 5,225 | 5,499 |
| **Induced abortions in Calgary** | 5,668 | 5,483 | 5,636 | 5,734 | 5,565 | 5,469 | 5,638 | 5,506 | 5,874 | 6,220 |
| **Induced abortions in other areas** | 381 | 355 | 304 | 202 | 216 | 183 | 152 | 194 | 203 | 174 |
| **Induced abortions at all facilities** | 10,346 | 10,164 | 10,417 | 10,589 | 10,546 | 10,530 | 10,801 | 10,527 | 11,302 | 11,893 |
| **Percent in Edmonton** | 41.5 | 42.6 | 43.0 | 43.9 | 45.2 | 46.3 | 46.4 | 45.9 | 46.2 | 46.2 |
| **Percent in Calgary** | 54.8 | 53.9 | 54.1 | 54.2 | 52.8 | 51.9 | 52.2 | 52.3 | 52.0 | 52.3 |
| **Percent in other areas** | 3.7 | 3.5 | 2.9 | 1.9 | 2.0 | 1.7 | 1.4 | 1.8 | 1.8 | 1.5 |

**Sources:** Hospital Inpatient Files, October 2008 extraction.
Ambulatory Care Classification System, Alberta Health and Wellness, October 2008 extraction.

**Notes:** Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.1.6 Induced Abortions by Week of Gestation and Facility Type, Alberta, 1998 to 2007

| **All Facilities** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<9** | 4,585 | 4,137 | 4,518 | 4,307 | 4,765 | 5,320 | 5,006 | 4,247 | 4,427 | 5,121 |
| **9 - 12** | 4,570 | 4,690 | 4,656 | 4,937 | 4,441 | 3,862 | 4,271 | 4,571 | 5,159 | 4,967 |
| **13 - 16** | 786 | 910 | 800 | 886 | 871 | 877 | 1,011 | 1,118 | 1,154 | 1,226 |
| **17 - 20** | 375 | 402 | 431 | 449 | 388 | 391 | 438 | 509 | 486 | 495 |
| **>20** | 24 | 25 | 12 | 9 | 39 | 55 | 62 | 79 | 74 | 83 |
| **Total** | 10,352 | 10,164 | 10,417 | 10,590 | 10,588 | 10,530 | 10,801 | 10,527 | 11,302 | 11,893 |

| **Acute Care Hospitals** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<9** | 2,338 | 2,053 | 2,424 | 2,068 | 2,160 | 2,414 | 2,196 | 1,518 | 1,054 | 1,353 |
| **9 - 12** | 3,115 | 3,212 | 2,933 | 2,844 | 2,497 | 1,949 | 2,120 | 1,763 | 1,807 | 1,512 |
| **13 - 16** | 380 | 421 | 342 | 309 | 255 | 215 | 340 | 306 | 319 | 402 |
| **17 - 20** | 203 | 197 | 191 | 222 | 182 | 167 | 179 | 208 | 190 | 191 |
| **>20** | 17 | 21 | 5 | 3 | 33 | 43 | 57 | 70 | 73 | 75 |
| **Total** | 6,053 | 5,904 | 5,895 | 5,448 | 5,211 | 4,800 | 4,894 | 3,868 | 3,445 | 3,534 |

| **Private Clinics** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<9** | 2,247 | 2,084 | 2,094 | 2,239 | 2,605 | 2,906 | 2,810 | 2,729 | 3,373 | 3,768 |
| **9 - 12** | 1,455 | 1,478 | 1,723 | 2,093 | 1,944 | 1,913 | 2,151 | 2,808 | 3,352 | 3,455 |
| **13 - 16** | 406 | 489 | 458 | 577 | 616 | 662 | 671 | 812 | 835 | 824 |
| **17 - 20** | 172 | 205 | 240 | 227 | 206 | 224 | 259 | 301 | 296 | 304 |
| **>20** | 7 | 4 | 7 | 6 | 6 | 12 | 5 | 9 | 1 | 8 |
| **Total** | 4,299 | 4,260 | 4,522 | 5,142 | 5,377 | 5,730 | 5,907 | 6,659 | 7,857 | 8,359 |

Table 3.3.1.7 Percent of Induced Abortions by Week of Gestation and Facility Type, Alberta, 1998 to 2007

| **All Facilities** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<9** | 44.3 | 40.7 | 43.4 | 40.7 | 45.0 | 50.5 | 46.3 | 40.3 | 39.2 | 43.1 |
| **9 - 12** | 44.1 | 46.1 | 44.7 | 46.6 | 41.9 | 36.7 | 39.5 | 43.4 | 45.6 | 41.8 |
| **13 - 16** | 7.6 | 9.0 | 7.7 | 8.4 | 8.2 | 8.3 | 9.4 | 10.6 | 10.2 | 10.3 |
| **17 - 20** | 3.6 | 4.0 | 4.1 | 4.2 | 3.7 | 3.7 | 4.1 | 4.8 | 4.3 | 4.2 |
| **>20** | 0.2 | 0.2 | 0.1 | 0.1 | 0.4 | 0.5 | 0.6 | 0.8 | 0.7 | 0.7 |
| **Total** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

| **Acute Care Hospitals** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<9** | 38.6 | 34.8 | 41.1 | 38.0 | 41.5 | 50.3 | 44.9 | 39.2 | 30.6 | 38.3 |
| **9 - 12** | 51.5 | 54.4 | 49.8 | 52.2 | 47.9 | 40.6 | 43.3 | 45.6 | 52.5 | 42.8 |
| **13 - 16** | 6.3 | 7.1 | 5.8 | 5.7 | 4.9 | 4.5 | 6.9 | 7.9 | 9.3 | 11.4 |
| **17 - 20** | 3.4 | 3.3 | 3.2 | 4.1 | 3.5 | 3.5 | 3.7 | 5.4 | 5.5 | 5.4 |
| **>20** | 0.3 | 0.4 | 0.1 | 0.1 | 0.6 | 0.9 | 1.2 | 1.8 | 2.1 | 2.1 |
| **Total** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

| **Private Clinics** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<9** | 52.3 | 48.9 | 46.3 | 43.5 | 48.4 | 50.7 | 47.6 | 41.0 | 42.9 | 45.1 |
| **9 - 12** | 33.8 | 34.7 | 38.1 | 40.7 | 36.2 | 33.4 | 36.4 | 42.2 | 42.7 | 41.3 |
| **13 - 16** | 9.4 | 11.5 | 10.1 | 11.2 | 11.5 | 11.6 | 11.4 | 12.2 | 10.6 | 9.9 |
| **17 - 20** | 4.0 | 4.8 | 5.3 | 4.4 | 3.8 | 3.9 | 4.4 | 4.5 | 3.8 | 3.6 |
| **>20** | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 |
| **Total** | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

**Sources:** Hospital Inpatient Files, October 2008 extraction.

Ambulatory Care Classification System, Alberta Health and Wellness, October 2008 extraction.

**Notes:** Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.1.8 Induced Abortions by Week of Gestation and Maternal Age Group, Alberta, 2005 to 2007

| Induced abortions | | | | | | | Percent of induced abortions | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2005** | **< 9** | **9 -12** | **13 -16** | **17-20** | **>20** | **Alberta** | **2005** | **< 9** | **9 -12** | **13 -16** | **17-20** | **>20** | **Alberta** |
| **<15** | 8 | 11 | 9 | 2 | 0 | 30 | **<15** | 26.7 | 36.7 | 30.0 | 6.7 | 0.0 | 100.0 |
| **15-17** | 208 | 358 | 103 | 45 | 1 | 716 | **15-17** | 29.1 | 50.0 | 14.4 | 6.3 | 0.1 | 100.0 |
| **18-19** | 416 | 593 | 161 | 68 | 3 | 1,241 | **18-19** | 33.5 | 47.8 | 13.0 | 5.5 | 0.2 | 100.0 |
| **15-19** | 624 | 951 | 264 | 113 | 4 | 1,957 | **15-19** | 31.9 | 48.6 | 13.5 | 5.8 | 0.2 | 100.0 |
| **20-24** | 1,301 | 1,594 | 384 | 158 | 16 | 3,453 | **20-24** | 37.7 | 46.2 | 11.1 | 4.6 | 0.5 | 100.0 |
| **25-29** | 963 | 974 | 234 | 95 | 22 | 2,288 | **25-29** | 42.1 | 42.6 | 10.2 | 4.2 | 1.0 | 100.0 |
| **30-34** | 728 | 580 | 130 | 72 | 16 | 1,528 | **30-34** | 47.6 | 38.0 | 8.5 | 4.7 | 1.0 | 100.0 |
| **35-39** | 451 | 340 | 77 | 49 | 17 | 934 | **35-39** | 48.3 | 36.4 | 8.2 | 5.2 | 1.8 | 100.0 |
| **40-44** | 165 | 115 | 18 | 19 | 3 | 320 | **40-44** | 51.6 | 35.9 | 5.6 | 5.9 | 0.9 | 100.0 |
| **>44** | 7 | 6 | 2 | 1 | 1 | 17 | **>44** | 41.2 | 35.3 | 11.8 | 5.9 | 5.9 | 100.0 |
| **All** | 4,247 | 4,571 | 1,118 | 509 | 79 | 10,527 | **All** | 40.3 | 43.4 | 10.6 | 4.8 | 0.8 | 100.0 |
| **2006** | **< 9** | **9 -12** | **13 -16** | **17-20** | **>20** | **Alberta** | **2006** | **< 9** | **9 -12** | **13 -16** | **17-20** | **>20** | **Alberta** |
| **<15** | 9 | 14 | 10 | 2 | 0 | 35 | **<15** | 25.7 | 40.0 | 28.6 | 5.7 | 0.0 | 100.0 |
| **15-17** | 224 | 368 | 111 | 44 | 2 | 749 | **15-17** | 29.9 | 49.1 | 14.8 | 5.9 | 0.3 | 100.0 |
| **18-19** | 419 | 572 | 172 | 71 | 1 | 1,235 | **18-19** | 33.9 | 46.3 | 13.9 | 5.7 | 0.1 | 100.0 |
| **15-19** | 643 | 940 | 283 | 115 | 3 | 1,984 | **15-19** | 32.4 | 47.4 | 14.3 | 5.8 | 0.2 | 100.0 |
| **20-24** | 1,398 | 1,823 | 396 | 139 | 7 | 3,764 | **20-24** | 37.1 | 48.4 | 10.5 | 3.7 | 0.2 | 100.0 |
| **25-29** | 1,054 | 1,204 | 225 | 92 | 22 | 2,598 | **25-29** | 40.6 | 46.3 | 8.7 | 3.5 | 0.8 | 100.0 |
| **30-34** | 694 | 675 | 134 | 69 | 31 | 1,603 | **30-34** | 43.3 | 42.1 | 8.4 | 4.3 | 1.9 | 100.0 |
| **35-39** | 478 | 371 | 77 | 47 | 9 | 982 | **35-39** | 48.7 | 37.8 | 7.8 | 4.8 | 0.9 | 100.0 |
| **40-44** | 137 | 128 | 26 | 22 | 2 | 315 | **40-44** | 43.5 | 40.6 | 8.3 | 7.0 | 0.6 | 100.0 |
| **>44** | 14 | 4 | 3 | 0 | 0 | 21 | **>44** | 66.7 | 19.0 | 14.3 | 0.0 | 0.0 | 100.0 |
| **All** | 4,427 | 5,159 | 1,154 | 486 | 74 | 11,302 | **All** | 39.2 | 45.6 | 10.2 | 4.3 | 0.7 | 100.0 |
| **2007** | **< 9** | **9 -12** | **13 -16** | **17-20** | **>20** | **Alberta** | **2007** | **< 9** | **9 -12** | **13 -16** | **17-20** | **>20** | **Alberta** |
| **<15** | 8 | 23 | 7 | 2 | 0 | 40 | **<15** | 20.0 | 57.5 | 17.5 | 5.0 | 0.0 | 100.0 |
| **15-17** | 248 | 357 | 108 | 41 | 0 | 754 | **15-17** | 32.9 | 47.3 | 14.3 | 5.4 | 0.0 | 100.0 |
| **18-19** | 433 | 623 | 199 | 66 | 2 | 1,323 | **18-19** | 32.7 | 47.1 | 15.0 | 5.0 | 0.2 | 100.0 |
| **15-19** | 681 | 980 | 307 | 107 | 2 | 2,077 | **15-19** | 32.8 | 47.2 | 14.8 | 5.2 | 0.1 | 100.0 |
| **20-24** | 1,654 | 1,624 | 394 | 140 | 16 | 3,828 | **20-24** | 43.2 | 42.4 | 10.3 | 3.7 | 0.4 | 100.0 |
| **25-29** | 1,268 | 1,107 | 263 | 107 | 23 | 2,768 | **25-29** | 45.8 | 40.0 | 9.5 | 3.9 | 0.8 | 100.0 |
| **30-34** | 797 | 655 | 133 | 74 | 22 | 1,681 | **30-34** | 47.4 | 39.0 | 7.9 | 4.4 | 1.3 | 100.0 |
| **35-39** | 526 | 436 | 84 | 48 | 13 | 1,108 | **35-39** | 47.5 | 39.4 | 7.6 | 4.3 | 1.2 | 100.0 |
| **40-44** | 172 | 134 | 36 | 17 | 7 | 366 | **40-44** | 47.0 | 36.6 | 9.8 | 4.6 | 1.9 | 100.0 |
| **>44** | 15 | 8 | 2 | 0 | 0 | 25 | **>44** | 60.0 | 32.0 | 8.0 | 0.0 | 0.0 | 100.0 |
| **All** | 5,121 | 4,967 | 1,226 | 495 | 83 | 11,893 | **All** | 43.1 | 41.8 | 10.3 | 4.2 | 0.7 | 100.0 |

**Sources:** Hospital Inpatient Files, October 2008 extraction.
Ambulatory Care Classification System, Alberta Health and Wellness, October 2008 extraction.

**Notes:** Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.1.9 Induced Abortions and Rate by Year and Maternal Age Group, Alberta, 1998 to 2007

| **Induced abortions** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<15** | 60 | 45 | 44 | 39 | 50 | 45 | 37 | 42 | 43 | 52 |
| **15-17** | 951 | 898 | 811 | 810 | 743 | 760 | 734 | 717 | 764 | 751 |
| **18-19** | 1,407 | 1,312 | 1,410 | 1,481 | 1,388 | 1,296 | 1,289 | 1,239 | 1,254 | 1,340 |
| **15-19** | 2,358 | 2,210 | 2,221 | 2,291 | 2,131 | 2,056 | 2,023 | 1,956 | 2,018 | 2,091 |
| **20-24** | 3,136 | 3,196 | 3,375 | 3,371 | 3,487 | 3,627 | 3,651 | 3,500 | 3,791 | 3,902 |
| **25-29** | 2,058 | 2,077 | 2,234 | 2,122 | 2,187 | 2,275 | 2,412 | 2,334 | 2,633 | 2,824 |
| **30-34** | 1,312 | 1,368 | 1,373 | 1,428 | 1,535 | 1,488 | 1,497 | 1,551 | 1,620 | 1,781 |
| **35-39** | 904 | 882 | 903 | 912 | 984 | 937 | 989 | 956 | 1,016 | 1,130 |
| **40-44** | 270 | 289 | 306 | 319 | 368 | 367 | 375 | 332 | 325 | 379 |
| **>44** | 33 | 28 | 20 | 29 | 32 | 30 | 24 | 29 | 40 | 36 |
| **Total** | 10,131 | 10,095 | 10,476 | 10,511 | 10,774 | 10,825 | 11,008 | 10,700 | 11,486 | 12,195 |

| **Rate (per 1,000 women)** | **1998** | **1999** | **2000** | **200[illegible]** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<15** | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.5 |
| **15-17** | 15.2 | 13.9 | 12.4 | 12.2 | 11.0 | 11.3 | 10.8 | 10.4 | 10.8 | 10.5 |
| **18-19** | 35.5 | 32.0 | 33.0 | 33.4 | 30.5 | 28.2 | 27.9 | 26.7 | 27.1 | 28.1 |
| **15-19** | 23.1 | 20.9 | 20.5 | 20.6 | 18.9 | 18.1 | 17.7 | 16.9 | 17.3 | 17.6 |
| **20-24** | 31.9 | 31.3 | 32.6 | 31.6 | 31.6 | 31.8 | 31.3 | 29.6 | 31.0 | 30.7 |
| **25-29** | 19.8 | 19.6 | 21.1 | 19.9 | 19.9 | 20.4 | 21.2 | 20.1 | 21.7 | 21.9 |
| **30-34** | 11.4 | 12.1 | 12.4 | 12.7 | 13.5 | 13.0 | 13.1 | 13.4 | 13.8 | 14.5 |
| **35-39** | 6.8 | 6.6 | 6.8 | 7.0 | 7.8 | 7.7 | 8.3 | 8.1 | 8.4 | 9.1 |
| **40-44** | 2.2 | 2.3 | 2.3 | 2.4 | 2.7 | 2.7 | 2.7 | 2.4 | 2.4 | 2.8 |
| **>44** | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 |
| **Total** | 13.1 | 12.7 | 13.1 | 12.9 | 13.0 | 12.9 | 13.0 | 12.5 | 13.2 | 13.6 |

| **Rate (per 100 estimated pregnancies)** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<15** | 63.8 | 60.0 | 63.8 | 51.3 | 62.5 | 68.2 | 54.4 | 73.7 | 62.3 | 57.8 |
| **15-17** | 48.2 | 47.2 | 47.8 | 49.9 | 50.2 | 52.1 | 51.3 | 50.4 | 49.1 | 46.4 |
| **18-19** | 40.9 | 39.7 | 41.9 | 44.3 | 42.8 | 42.3 | 42.8 | 40.6 | 40.6 | 41.1 |
| **15-19** | 43.6 | 42.5 | 43.9 | 46.1 | 45.1 | 45.5 | 45.6 | 43.7 | 43.5 | 42.8 |
| **20-24** | 26.6 | 26.7 | 28.6 | 28.6 | 28.5 | 28.8 | 29.2 | 28.0 | 28.2 | 27.7 |
| **25-29** | 13.7 | 13.8 | 15.1 | 14.4 | 14.3 | 14.3 | 14.7 | 13.8 | 14.4 | 14.2 |
| **30-34** | 10.1 | 10.7 | 11.0 | 11.0 | 11.3 | 10.5 | 10.3 | 10.4 | 10.1 | 10.3 |
| **35-39** | 15.2 | 14.2 | 14.5 | 14.4 | 15.2 | 14.1 | 14.7 | 13.6 | 13.3 | 13.4 |
| **40-44** | 22.9 | 22.2 | 22.9 | 23.7 | 25.8 | 22.3 | 23.2 | 19.7 | 19.3 | 19.7 |
| **>44** | 36.3 | 31.1 | 42.6 | 34.5 | 36.0 | 31.6 | 25.3 | 29.3 | 30.1 | 29.3 |
| **Total** | 19.3 | 19.2 | 20.3 | 20.1 | 20.0 | 19.5 | 19.5 | 18.5 | 18.6 | 18.3 |

**Source**: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May 2008 release.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

Notes: 1. Total rate = total induced abortions / number of women aged 15-49 x 1,000.

2. The age-specific rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 44-49 age groups, respectively.

Totals for age groups include unknown ages.

Data include Alberta residents only, with the exception of spontaneous abortion data (included in estimated pregnancies) prior to 2000, which may contain 'out of province' cases.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.1.10 Induced Abortions and Rate by Year and Residence RHA, Alberta, 1998 to 2007

| Induced abortions | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 263 | 299 | 285 | 288 | 282 | 275 | 337 | 268 | 301 | 292 |
| Palliser | 194 | 176 | 255 | 220 | 232 | 225 | 215 | 216 | 254 | 280 |
| Calgary | 4,393 | 4,458 | 4,531 | 4,598 | 4,668 | 4,632 | 4,687 | 4,531 | 4,863 | 5,210 |
| David Thompson | 653 | 648 | 725 | 744 | 766 | 794 | 809 | 781 | 833 | 865 |
| East Central | 195 | 162 | 179 | 176 | 194 | 175 | 183 | 167 | 207 | 222 |
| Capital | 3,517 | 3,418 | 3,555 | 3,539 | 3,657 | 3,691 | 3,739 | 3,597 | 3,833 | 4,054 |
| Aspen | 413 | 430 | 410 | 426 | 477 | 494 | 478 | 497 | 528 | 564 |
| Peace Country | 342 | 316 | 349 | 310 | 330 | 326 | 379 | 403 | 409 | 429 |
| Northern Lights | 161 | 188 | 187 | 210 | 168 | 213 | 181 | 240 | 258 | 279 |
| Alberta | 10,131 | 10,095 | 10,476 | 10,511 | 10,774 | 10,825 | 11,008 | 10,700 | 11,486 | 12,195 |

| Rate (per 1,000 women 15-49) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 7.2 | 8.1 | 7.6 | 7.7 | 7.5 | 7.3 | 9.0 | 7.1 | 8.0 | 7.6 |
| Palliser | 8.4 | 7.4 | 10.6 | 9.0 | 9.3 | 9.1 | 8.6 | 8.6 | 10.0 | 10.8 |
| Calgary | 15.7 | 15.4 | 15.4 | 15.2 | 15.1 | 14.7 | 14.7 | 14.0 | 14.7 | 15.3 |
| David Thompson | 9.6 | 9.3 | 10.3 | 10.4 | 10.5 | 10.8 | 10.9 | 10.5 | 11.0 | 11.1 |
| East Central | 7.6 | 6.3 | 6.9 | 6.7 | 7.4 | 6.7 | 7.0 | 6.4 | 7.9 | 8.3 |
| Capital | 14.3 | 13.6 | 14.0 | 13.8 | 14.0 | 14.0 | 14.1 | 13.5 | 14.1 | 14.5 |
| Aspen | 9.4 | 9.7 | 9.2 | 9.5 | 10.6 | 11.0 | 10.7 | 11.2 | 11.9 | 12.5 |
| Peace Country | 10.4 | 9.4 | 10.3 | 9.1 | 9.5 | 9.4 | 10.8 | 11.4 | 11.3 | 11.5 |
| Northern Lights | 9.4 | 10.8 | 10.5 | 11.5 | 8.7 | 10.6 | 8.8 | 11.4 | 12.0 | 12.2 |
| Alberta | 13.1 | 12.7 | 13.1 | 12.9 | 13.0 | 12.9 | 13.0 | 12.5 | 13.2 | 13.6 |

| Rate (per 100 estimated pregnancies) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 10.2 | 11.4 | 11.6 | 11.7 | 11.3 | 10.5 | 12.7 | 10.1 | 10.6 | 9.6 |
| Palliser | 12.3 | 11.3 | 15.5 | 13.7 | 14.3 | 13.6 | 12.9 | 12.1 | 14.0 | 13.5 |
| Calgary | 23.1 | 23.2 | 23.6 | 23.8 | 23.4 | 22.0 | 22.1 | 20.6 | 20.9 | 20.7 |
| David Thompson | 14.1 | 13.8 | 15.7 | 16.0 | 15.9 | 16.1 | 16.1 | 15.4 | 15.1 | 14.8 |
| East Central | 14.6 | 12.8 | 14.7 | 14.7 | 14.8 | 14.5 | 14.0 | 13.1 | 15.0 | 15.2 |
| Capital | 21.9 | 21.2 | 22.6 | 22.2 | 22.4 | 22.0 | 21.9 | 20.9 | 20.7 | 20.0 |
| Aspen | 12.5 | 13.1 | 13.7 | 13.7 | 14.9 | 15.6 | 15.2 | 15.7 | 15.4 | 15.7 |
| Peace Country | 13.5 | 12.5 | 14.4 | 12.7 | 13.1 | 12.5 | 14.4 | 14.3 | 13.5 | 13.8 |
| Northern Lights | 11.6 | 13.5 | 13.0 | 13.8 | 10.3 | 13.0 | 10.8 | 13.1 | 13.5 | 12.9 |
| Alberta | 19.3 | 19.2 | 20.3 | 20.1 | 20.0 | 19.5 | 19.5 | 18.5 | 18.6 | 18.3 |

**Source**: Vital Statistics, Birth and Stillbirth Files, Service Alberta, May 2008 release.
Fee-for-Services Claims Files, Alberta Health and Wellness.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness.

**Notes:** Totals for RHAs include unknown RHAs.
Data include Alberta residents only, with the exception of spontaneous abortion data (included in estimated pregnancies) prior to 2000, which may contain 'out of province' cases.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

## 3.3.2 Labour Induction

Induced labour: *Initiation of labour prior to spontaneous onset, for the purpose of accomplishing delivery.* Inductions can be performed after admission to hospital (inpatient inductions) or prior to admission (outpatient inductions). Most outpatient inductions are medical inductions.

Medical induction: *Induction with oxytocic agents, prostaglandin agents, and/or nipple stimulation.*

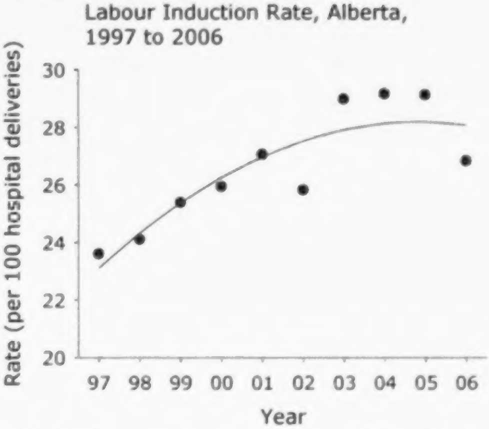
Surgical induction: *Induction by means of membrane sweeping, artificial rupture of membranes, and/or mechanical cervical ripening.*

Combined induction: *Induction by any combination of medical and surgical means.*

Rates for the above procedures are per 100 hospital deliveries.

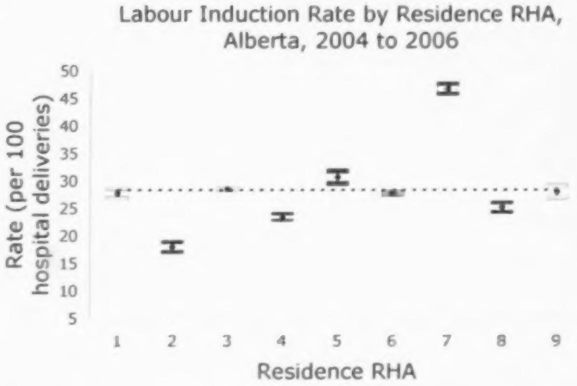
Labour induction has been practiced for centuries. The earliest inductions were performed to enable delivery after fetal death, but labour inductions today are carried out for a wider variety of reasons, including threats to fetal or maternal health and availability of specialist services (e.g., fetal surgery, anaesthesia). Common methods involve the administration of prostoglandins or oxytocin (medical inductions) and membrane sweeping and amniotomy (surgical inductions; MacKenzie, 2006).

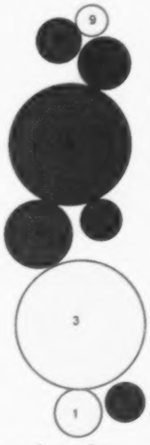
### Time Trends (see Table 3.3.2.1)



- The total induction rate increased from 1997 to 2005, with a drop in 2006. Inductions were undercounted from April 2002 to March 2003 (see Limitations and Methodology Notes). In 2006, 26.8% of hospital deliveries in Alberta involved labour induction.
- Most inductions are medical inductions.

### Regional Data (see Tables 3.3.2.2, 3.3.2.3)



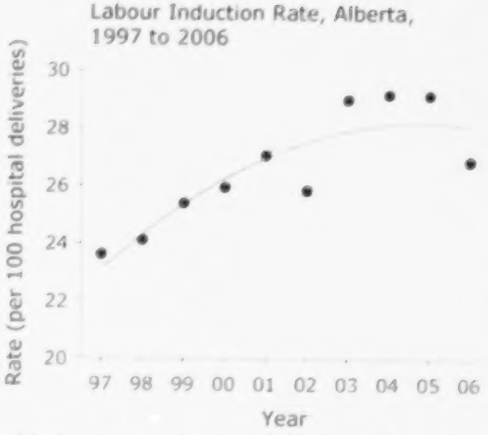


- The rate of labour induction (total inductions) was lower than the provincial average in RHAs 2, 4, 6, and 8 for 2004 to 2006 combined. The rate was lowest in RHA 2 (18.0 per 100 hospital deliveries).
- The rate was higher than the provincial average in RHAs 5 and 7, with the highest rate in RHA 7 (46.7 per 100 hospital deliveries, or almost half of deliveries).
- Rates in many RHAs show decreasing trends from 2004 to 2006.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

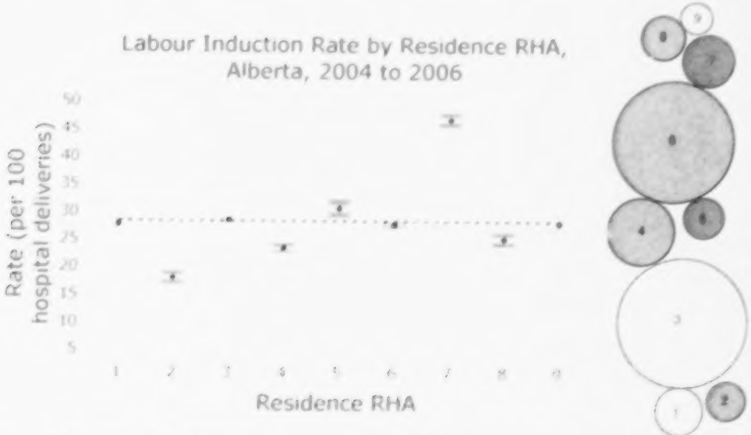
# 3.3.2 Labour Induction

## Time Trends (see Table 3.3.2.1)


Labour Induction Rate, Alberta, 1997 to 2006

- The total induction rate increased from 1997 to 2005, with a drop in 2006. Inductions were undercounted from April 2002 to March 2003 (see Limitations and Methodology Notes). In 2006, 26.8% of hospital deliveries in Alberta involved labour induction.
- Most inductions are medical inductions.

## Regional Data (see Tables 3.3.2.2, 3.3.2.3)


Labour Induction Rate by Residence RHA, Alberta, 2004 to 2006

- The rate of labour induction (total inductions) was lower than the provincial average in RHAs 2, 4, 6, and 8 for 2004 to 2006 combined. The rate was lowest in RHA 2 (18.0 per 100 hospital deliveries).
- The rate was higher than the provincial average in RHAs 5 and 7, with the highest rate in RHA 7 (46.7 per 100 hospital deliveries, or almost half of deliveries).
- Rates in many RHAs show decreasing trends from 2004 to 2006.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

# 3.3.2 Labour Induction

Labour Induction Rate (per 100 hospital deliveries), 2004-06 Combined

9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Centra
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

From April 2002 to March 2003, inductions performed on outpatient bases were not captured, resulting in under-estimation of induction rates for this time period. From April 2003 onward, outpatient inductions were included in total inductions but were not categorized as medical, surgical, or combined. Consequently, "total inductions" is greater than the sum of medical, surgical, and combined from 2003 onward.

Rates are calculated based on hospital deliveries only; out-of-hospital deliveries are not included in total deliveries in this section.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 Deliveries data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

## 3.3.2 Labour Induction

Common indications for labour induction include post-term pregnancy, pre-labour rupture of membranes, fetal compromise, and maternal medical conditions. Risks of labour induction include increased rates of cesarean birth, operative vaginal delivery, and excessive uterine activity. Induction for convenience remains a controversial issue (Crane, 2001).

**Labour Induction Rate (per 100 hospital deliveries), 2004-06 Combined**

9 Northern Lights
3 Calgary
1 Chinook

### Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

From April 2002 to March 2003, inductions performed on outpatient bases were not captured, resulting in under-estimation of induction rates for this time period. From April 2003 onward, outpatient inductions were included in total inductions but were not categorized as medical, surgical, or combined. Consequently, "total inductions" is greater than the sum of medical, surgical, and combined from 2003 onward.

Rates are calculated based on hospital deliveries only; out-of-hospital deliveries are not included in total deliveries in this section.

See the Methodology and Limitations section in the Introduction for a caution regarding comparison of 2002 Deliveries data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.3.2.1 Labour Inductions and Rates, Alberta, 1997 to 2006[1]

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 35,553 | 36,672 | 36,985 | 35,825 | 36,315 | 37,351 | 38,865 | 39,377 | 40,449 | 43,104 |
| **Total inductions[2]** | 8,391 | 8,838 | 9,388 | 9,291 | 9,823 | 9,645 | 11,261 | 11,482 | 11,782 | 11,567 |
| **Total inductions rate (per 100 hospital deliveries)** | 23.6 | 24.1 | 25.4 | 25.9 | 27.0 | 25.8 | 29.0 | 29.2 | 29.1 | 26.8 |
| **Medical inductions** | 6,278 | 6,813 | 7,153 | 7,146 | 7,275 | 6,786 | 6,677 | 6,229 | 6,125 | 6,503 |
| **Medical induction rate (per 100 hospital deliveries)** | 17.7 | 18.6 | 19.3 | 19.9 | 20.0 | 18.2 | 17.2 | 15.8 | 15.1 | 15.1 |
| **Surgical inductions** | 636 | 546 | 596 | 532 | 578 | 717 | 801 | 654 | 794 | 860 |
| **Surgical inductions rate (per 100 hospital deliveries)** | 1.8 | 1.5 | 1.6 | 1.5 | 1.6 | 1.9 | 2.1 | 1.7 | 2.0 | 2.0 |
| **Combined inductions** | 1,477 | 1,479 | 1,639 | 1,613 | 1,970 | 2,142 | 2,211 | 2,822 | 2,734 | 2,398 |
| **Combined inductions rate (per 100 hospital deliveries)** | 4.2 | 4.0 | 4.4 | 4.5 | 5.4 | 5.7 | 5.7 | 7.2 | 6.8 | 5.6 |

Table 3.3.2.2 Total Labour Inductions and Rates by Residence RHA, Alberta, 2004 to 2006[1] Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total inductions** | 1,726 | 697 | 12,670 | 2,703 | 1,164 | 9,875 | 3,330 | 1,537 | 1,129 | 34,831 |
| **Hospital deliveries** | 6,227 | 3,877 | 44,485 | 11,543 | 3,799 | 35,731 | 7,125 | 6,110 | 4,033 | 122,930 |
| **Rate (per 100 hospital deliveries)** | 27.7 | 18.0 | 28.5 | 23.4 | 30.6 | 27.6 | 46.7 | 25.2 | 28.0 | 28.3 |
| **Standard Error (SE)** | 0.57 | 0.62 | 0.21 | 0.39 | 0.75 | 0.24 | 0.59 | 0.56 | 0.71 | 0.13 |

**Sources:** Hospital Inpatient Files, May 2008 extraction
Ambulatory Care Classification System, Alberta Health and Wellness, May 2008 extraction

**Notes:** 1 From April 2002 to March 2003, inductions performed on outpatient bases were not captured, resulting in under-estimation of induction rates for this time period

2 From April 2003 onward, outpatient inductions were included in total inductions but were not categorized as medical, surgical, or combined. Consequently, "total inductions" is greater than the sum of medical, surgical, and combined from 2003 onward.

Totals for Alberta include unknown RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.2.3 Labour Inductions and Rates by Residence RHA and Year, Alberta, 2004 to 2006

| 2004 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 2,008 | 1,239 | 14,105 | 3,692 | 1,248 | 11,538 | 2,314 | 1,907 | 1,326 | 39,377 |
| **Total inductions** | 557 | 236 | 4,132 | 898 | 372 | 3,207 | 1,222 | 510 | 348 | 11,482 |
| **Total inductions rate (per 100 hospital deliveries)** | 27.7 | 19.0 | 29.3 | 24.3 | 29.8 | 27.8 | 52.8 | 26.7 | 26.2 | 29.2 |
| **Medical inductions** | 463 | 105 | 1,779 | 577 | 208 | 1,964 | 416 | 456 | 261 | 6,229 |
| **Medical induction rate (per 100 hospital deliveries)** | 23.1 | 8.5 | 12.6 | 15.6 | 16.7 | 17.0 | 18.0 | 23.9 | 19.7 | 15.8 |
| **Surgical inductions** | 41 | 8 | 266 | 52 | 41 | 171 | 37 | 23 | 15 | 654 |
| **Surgical inductions rate (per 100 hospital deliveries)** | 2.0 | 0.6 | 1.9 | 1.4 | 3.3 | 1.5 | 1.6 | 1.2 | 1.1 | 1.7 |
| **Combined inductions** | 18 | 19 | 1,685 | 195 | 88 | 685 | 75 | 19 | 38 | 2,822 |
| **Combined inductions rate (per 100 hospital deliveries)** | 0.9 | 1.5 | 11.9 | 5.3 | 7.1 | 5.9 | 3.2 | 1.0 | 2.9 | 7.2 |

| 2005 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 2,038 | 1,302 | 14,830 | 3,746 | 1,229 | 11,635 | 2,341 | 2,002 | 1,326 | 40,449 |
| **Total inductions** | 583 | 244 | 4,229 | 874 | 387 | 3,335 | 1,216 | 508 | 406 | 11,782 |
| **Total inductions rate (per 100 hospital deliveries)** | 28.6 | 18.7 | 28.5 | 23.3 | 31.5 | 28.7 | 51.9 | 25.4 | 30.6 | 29.1 |
| **Medical inductions** | 484 | 100 | 1,708 | 573 | 199 | 2,010 | 411 | 403 | 237 | 6,125 |
| **Medical induction rate (per 100 hospital deliveries)** | 23.7 | 7.7 | 11.5 | 15.3 | 16.2 | 17.3 | 17.6 | 20.1 | 17.9 | 15.1 |
| **Surgical inductions** | 50 | 5 | 329 | 37 | 31 | 209 | 41 | 50 | 42 | 794 |
| **Surgical inductions rate (per 100 hospital deliveries)** | 2.5 | 0.4 | 2.2 | 1.0 | 2.5 | 1.8 | 1.8 | 2.5 | 3.2 | 2.0 |
| **Combined inductions** | 11 | 21 | 1,557 | 177 | 122 | 650 | 65 | 29 | 102 | 2,734 |
| **Combined inductions rate (per 100 hospital deliveries)** | 0.5 | 1.6 | 10.5 | 4.7 | 9.9 | 5.6 | 2.8 | 1.4 | 7.7 | 6.8 |

| 2006 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 2,181 | 1,336 | 15,550 | 4,105 | 1,322 | 12,558 | 2,470 | 2,201 | 1,381 | 43,104 |
| **Total inductions** | 586 | 217 | 4,309 | 931 | 405 | 3,333 | 892 | 519 | 375 | 11,567 |
| **Total inductions rate (per 100 hospital deliveries)** | 26.9 | 16.2 | 27.7 | 22.7 | 30.6 | 26.5 | 36.1 | 23.6 | 27.2 | 26.8 |
| **Medical inductions** | 496 | 71 | 1,932 | 720 | 225 | 1,987 | 405 | 418 | 249 | 6,503 |
| **Medical induction rate (per 100 hospital deliveries)** | 22.7 | 5.3 | 12.4 | 17.5 | 17.0 | 15.8 | 16.4 | 19.0 | 18.0 | 15.1 |
| **Surgical inductions** | 43 | 5 | 404 | 42 | 35 | 223 | 38 | 51 | 19 | 860 |
| **Surgical inductions rate (per 100 hospital deliveries)** | 2.0 | 0.4 | 2.6 | 1.0 | 2.6 | 1.8 | 1.5 | 2.3 | 1.4 | 2.0 |
| **Combined inductions** | 14 | 11 | 1,274 | 113 | 105 | 697 | 67 | 33 | 84 | 2,398 |
| **Combined inductions rate (per 100 hospital deliveries)** | 0.6 | 0.8 | 8.2 | 2.8 | 7.9 | 5.6 | 2.7 | 1.5 | 6.1 | 5.6 |

**Sources:** Hospital Inpatient Files, May 2008 extraction
Ambulatory Care Classification System, Alberta Health and Wellness, May 2008 extraction

**Notes:** Totals for Alberta include unknown RHAs
Data may differ from previously published data due to differences in definitions and dates of data extraction

## 3.3.3 Deliveries

Epidural analgesia: *A method of pain relief consisting of continuous bathing of lumbar or thoracic nerve roots within the epidural space with an injected anesthetic solution* (Dorland, 2000).

Forceps delivery: *Extraction of a fetus by application of forceps to the fetal head* (Dorland, 2000).

Vacuum extraction: *A suction cup is placed on the baby's head and vacuum pressure is applied to pull the baby out of the vagina* (Morgan, 1990).

Cesarean section: *Incision through the abdominal and uterine walls for delivery of a fetus* (Dorland, 2000).

Shoulder dystocia: *Dystocia is defined as abnormal or difficult labour due to the shape, size or position of the fetus (Dorland, 2000). In this case it is considered to occur when there is an impediment to the shoulder in the birth [illegible] after the head has been delivered.*

Rates for the above procedures are per 100 hospital deliveries.

Episiotomy: *Surgical incision into the perineum and vagina to facilitate delivery.*

Episiotomy rate: *Number of episiotomies per 100 vaginal deliveries.*

Vaginal birth after cesarean section (VBAC): *A vaginal birth following a cesarean section.*

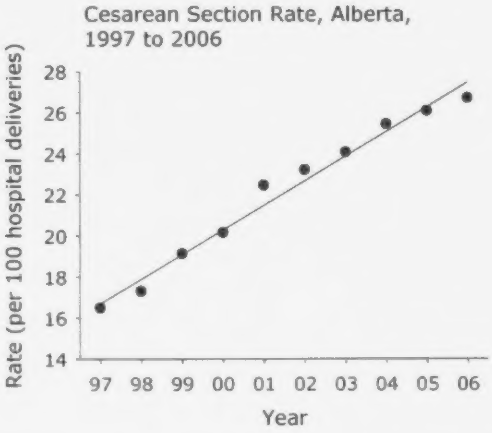
VBAC attempt rate: *Number of attempted VBACs per 100 repeat cesareans + VBACs.*

VBAC occurrence rate: *Number of VBACs per 100 repeat cesareans + VBACs.*

VBAC success rate: *Number of VBACs per 100 trials of labour.*

### Time Trends (see Tables 3.3.3.1, 3.3.3.4, 3.3.3.7, 3.3.3.10)

- The epidural analgesia rate (per 100 hospital deliveries) increased steadily between 2000 and 2006, from 36.0% to.44.2% of hospital deliveries.
- The forceps delivery rate has been stable since 2001. In 2006, 5.6% of deliveries had forceps assistance. The vacuum delivery rate increased slightly in 2003 and 2004 to 12.1% but has also been quite stable over several years. In 2006, 11.4% of hospital deliveries were vacuum assisted.



- The cesarean section rate in Alberta increased steadily between 1997 and 2006. In 2006, there were 11,512 cesarean sections performed, for a rate of 26.7 (per 100 hospital deliveries). Repeat cesareans comprised 38.7% of cesarean section deliveries in 2006.
- The vaginal birth after cesarean section (VBAC) attempt rate and occurrence rate both declined over time between 1997and 2006. In 2006, VBACs were attempted after 25.5% of previous cesarean deliveries. VBACs actually occurred after 19.4% of previous cesareans.
- The VBAC success rate was stable from 1997 to 1999 and decreased from 2000 to 2004 before increasing again in 2005 and 2006. In 2006, 76.1% of attempted VBACs were successful, down from 81.9% in 1997.
- The episiotomy rate decreased between 2000 and 2006. The 2006 episiotomy rate was 13.1 (per 100 vaginal deliveries), compared with 17.2 in 2000.
- The shoulder dystocia rate increased steadily between 1997 and 2006. In 2006, there were 2,079 cases of shoulder dystocia, for a rate of 4.7 (per 100 hospital deliveries). The rate in 2006 was more than triple that of 1997.

## 3.3.3 Deliveries

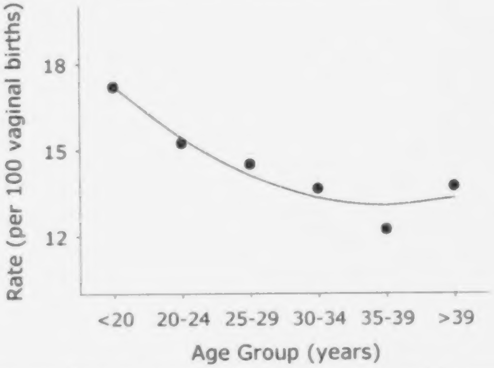
About half of all vaginal deliveries in Canada involve epidural analgesia. Epidural analgesia tends to be most common in large urban hospitals and for first births, older mothers, and Caucasian mothers (Canadian Institute for Health Information, 2004; Truman, Jin, & Johnson, 2002). Epidural analgesia is an effective pain control method, however its use is associated with longer labour, increased incidence of fever in mothers, and increased rates of instrument-assisted (e.g., forceps, vacuum) deliveries (Canadian Institute for Health Information, 2007).

Instrumental deliveries (with forceps or vacuum) occur more often with older mothers and pregnancies with complications such as previous cesarean section, delayed labour, fetal distress, maternal hypertension, etc. Maternal injury is more common with forceps than with vacuum extraction. Some fetal injuries occur more often after vacuum extraction (e.g., bruising on the skull and retinal hemorrhages), while others are more frequent following forceps use (e.g., external eye injuries and facial nerve palsies; Cargill, MacKinnon, et al., 2004; Wen et al, 2001).

The Society of Obstetricians and Gynaecologists of Canada states that routine episiotomy "does not reduce and may increase the incidence of maternal trauma". Episiotomy is indicated in the rare case where the perineum is preventing delivery (Cargill, MacKinnon, et al., 2004).

### Maternal Age Effects (see Tables 3.3.3.8, 3.3.3.11)

Episiotomy Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined



- Teenage mothers were most likely to have an episiotomy for 2004 to 2006 combined, and the episiotomy rate decreased with increasing maternal age. The rate for women under 20 was 17.2 (per 100 vaginal deliveries).
- There was only small variation in shoulder dystocia rates with maternal age between 2004 and 2006, with some tendency for higher rates in younger mothers and lower rates in older mothers.
- Maternal age data are not available for the other delivery indicators.

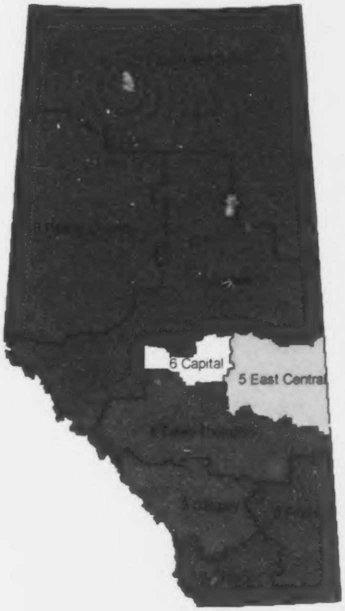
### Regional Data (see Tables 3.3.3.2, 3.3.3.3, 3.3.3.5, 3.3.3.6, 3.3.3.9, 3.3.3.12)

- For 2004 to 2006 combined, the epidural analgesia rate was higher than the provincial average in RHAs 3 and 6, and lower in all other RHAs. The rate varied greatly, from 6.9% (RHA 2) of hospital deliveries to 55.0% (RHA 6).
- The forceps delivery rate for 2004 to 2006 combined was lower than the provincial average in RHAs 1, 2, 3, 7, and 8, with the lowest rate in RHA 8 (1.5 per 100 hospital deliveries). The rate was higher than the provincial average in RHAs 5, 6, and 9; the highest rate was in RHA 9 (8.1).
- The vacuum extraction rate was significantly lower than the provincial average in RHAs 1, 2, 4, 6, 7, and 8 for 2004 to 2006 combined. The lowest rate was in RHA 4 (4.6 per 100 hospital deliveries). The vacuum extraction rate was significantly higher than the provincial average in RHAs 3, 5, and 9, with the highest rate (17.0) in RHA 3.
- The cesarean section rate was lower than the provincial average in RHAs 1, 2, 7, 8, and 9, and higher in RHAs 3 and 4 for 2004 to 2006 combined. The rate did not vary greatly, from 23.1 (per 100 hospital deliveries) in RHAs 1 and 8, to 27.5 in RHA 3.

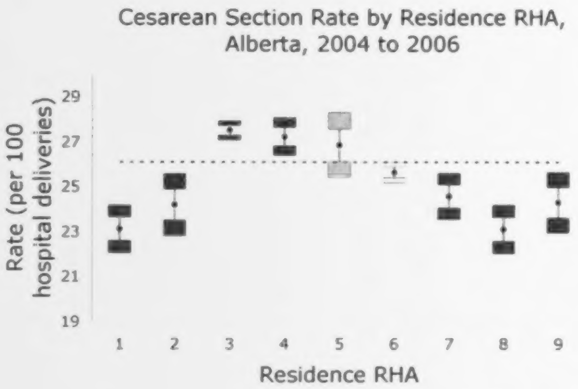
## 3.3.3 Deliveries

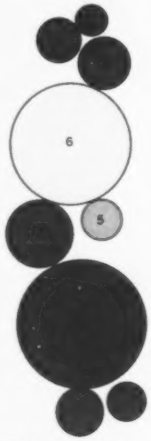
Cesarean section rates show an increasing trend over the last several years in many industrialized countries. Delayed childbearing and rising maternal obesity rates contribute to the increase. Shortage of maternal care providers and changing attitudes toward childbirth may also play roles (Society of Obstetricians and Gynaecologists of Canada, 2008). Elective cesarean delivery by maternal request is a current topic of debate.

Cesarean Section Rate (per 100 hospital deliveries), 2004-06 Combined



### Regional Data continued (see Tables 3.3.3.2, 3.3.3.3, 3.3.3.5, 3.3.3.6, 3.3.3.9, 3.3.3.12)



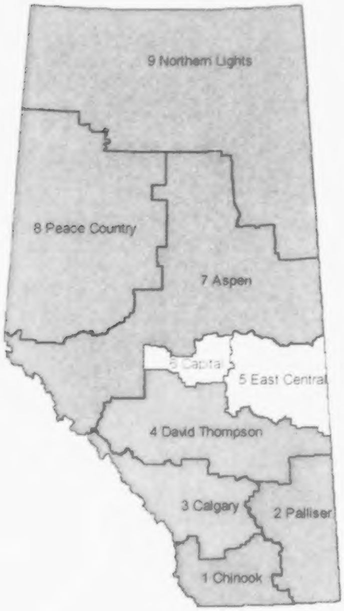


- The VBAC occurrence rate was lower than the provincial average in RHA 2 between 2004 and 2006. The rate was higher than the provincial average in RHAs 1, 5, and 9 during that time period. Rates varied from 18.4 (per 100 VBACs + repeat cesareans) in RHA 7 to 30.1 in RHA 9.
- Episiotomy rates were lower than the provincial average in RHAs 1, 3, 7, and 8, and higher than the provincial average in RHAs 5, 6, and 9 for 2004 to 2006 combined. Regional rates ranged from 11.1% of hospital deliveries (RHA 3) to 24.9% (RHA 9).
- For 2004 to 2006 combined, the shoulder dystocia rate was lower than the provincial average in RHAs 4 and 6, with the lowest rate in RHA 4 (3.1 per 100 hospital deliveries). The rate was higher than the provincial average in RHAs 2, 5, and 9, with the highest rate in RHA 2 (10.2).

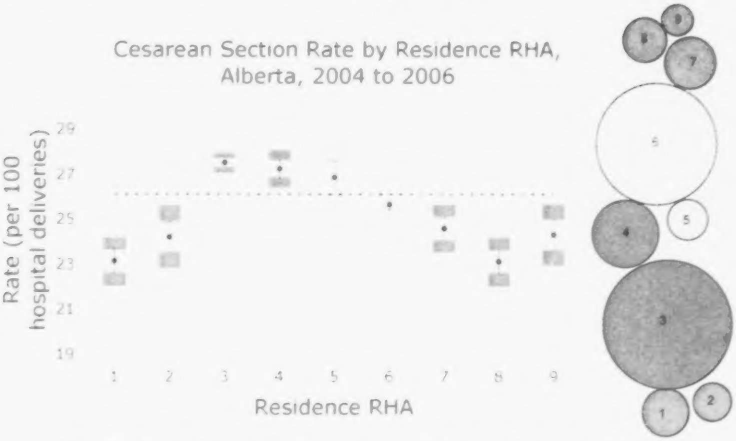
See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

## 3.3.3 Deliveries

Cesarean Section Rate (per 100 hospital deliveries), 2004-06 Combined



## Regional Data continued (see Tables 3.3.3.2, 3.3.3.3, 3.3.3.5, 3.3.3.6, 3.3.3.9, 3.3.3.12)


Cesarean Section Rate by Residence RHA, Alberta, 2004 to 2006

- The VBAC occurrence rate was lower than the provincial average in RHA 2 between 2004 and 2006. The rate was higher than the provincial average in RHAs 1, 5, and 9 during that time period. Rates varied from 18.4 (per 100 VBACs + repeat cesareans) in RHA 7 to 30.1 in RHA 9.
- Episiotomy rates were lower than the provincial average in RHAs 1, 3, 7, and 8, and higher than the provincial average in RHAs 5, 6, and 9 for 2004 to 2006 combined. Regional rates ranged from 11.1% of hospital deliveries (RHA 3) to 24.9% (RHA 9).
- For 2004 to 2006 combined, the shoulder dystocia rate was lower than the provincial average in RHAs 4 and 6, with the lowest rate in RHA 4 (3.1 per 100 hospital deliveries). The rate was higher than the provincial average in RHAs 2, 5, and 9, with the highest rate in RHA 2 (10.2).

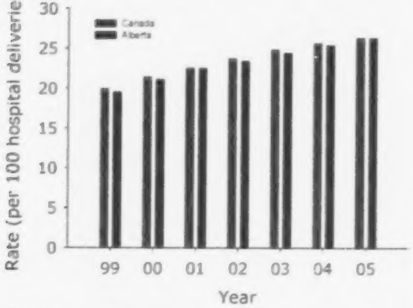
See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

## 3.3.3 Deliveries

The cesarean section rate was similar in Alberta and Canada between 1999 and 2005, with similar increases in the two jurisdictions during that time period (Statistics Canada, 2008b).

Cesarean Rates,
Alberta and Canada, 1999 to 2005

Source: Statistics Canada (2008b)



VBAC success rates are lower in the case of dystocia, malpresentation, or gestational hypertension in a prior delivery, labour induction, and maternal obesity, and are higher with a previous vaginal delivery (Landon, Leindecker, Spong, et al., 2005; Martel and MacKinnon, 2005).

Shoulder dystocia occurs most often (but not always) with macrosomic babies. Prediction of macrosomia is unreliable; cases of shoulder dystocia are often unexpected and represent an obstetric emergency. Brachial plexus nerve injury and occasionally death can result, but most cases do not result in chronic morbidity (Benjamin, 2005; Chauhan et al., 2005; Gherman, 2005).

### Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

Maternal age data are unavailable for all measures except episiotomy and shoulder dystocia.

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002 deliveries data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.3.3.1 Epidural Analgesia, Forceps and Vacuum Extraction Deliveries Cases and Rates, Alberta, 1997 to 2006

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 35,553 | 36,672 | 36,985 | 35,825 | 36,315 | 37,351 | 38,865 | 39,377 | 40,449 | 43,104 |
| **Epidural analgesia cases** | - | - | - | 12,904 | 13,958 | 14,781 | 16,253 | 16,651 | 17,748 | 19,064 |
| **Epidural analgesia rate (per 100 hospital deliveries)** | - | - | - | 36.0 | 38.4 | 39.6 | 41.8 | 42.3 | 43.9 | 44.2 |
| **Forceps deliveries** | 2,573 | 2,384 | 2,389 | 2,180 | 2,001 | 2,001 | 2,174 | 2,215 | 2,203 | 2,398 |
| **Forceps delivery rate (per 100 hospital deliveries)** | 7.2 | 6.5 | 6.5 | 6.1 | 5.5 | 5.4 | 5.6 | 5.6 | 5.4 | 5.6 |
| **Vacuum extraction deliveries** | 3,817 | 4,015 | 4,083 | 3,826 | 3,867 | 4,226 | 4,688 | 4,768 | 4,437 | 4,893 |
| **Vacuum extraction rate (per 100 hospital deliveries)** | 10.7 | 10.9 | 11.0 | 10.7 | 10.6 | 11.3 | 12.1 | 12.1 | 11.0 | 11.4 |

Table 3.3.3.2 Epidural Analgesia and Vacuum Extraction Deliveries and Rates by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 6,227 | 3,877 | 44,485 | 11,543 | 3,799 | 35,731 | 7,125 | 6,110 | 4,033 | 122,930 |
| **Epidural analgesia cases** | 2,079 | 268 | 23,145 | 2,365 | 1,545 | 19,646 | 1,948 | 827 | 1,342 | 53,463 |
| **Epidural analgesia rate (per 100 hospital deliveries)** | 33.4 | 6.9 | 52.0 | 20.5 | 40.7 | 55.0 | 27.3 | 13.5 | 33.3 | 43.5 |
| **Standard Error (SE)** | 0.60 | 0.41 | 0.24 | 0.38 | 0.80 | 0.26 | 0.53 | 0.44 | 0.74 | 0.14 |
| **Forceps deliveries** | 289 | 75 | 2,100 | 609 | 269 | 2,793 | 260 | 94 | 327 | 6,816 |
| **Forceps delivery rate (per 100 hospital deliveries)** | 4.6 | 1.9 | 4.7 | 5.3 | 7.1 | 7.8 | 3.6 | 1.5 | 8.1 | 5.5 |
| **Standard Error (SE)** | 0.27 | 0.22 | 0.10 | 0.21 | 0.42 | 0.14 | 0.22 | 0.16 | 0.43 | 0.07 |
| **Vacuum extractions** | 608 | 281 | 7,552 | 532 | 483 | 2,892 | 732 | 417 | 601 | 14,098 |
| **Vacuum extraction rate (per 100 hospital deliveries)** | 9.8 | 7.2 | 17.0 | 4.6 | 12.7 | 8.1 | 10.3 | 6.8 | 14.9 | 11.5 |
| **Standard Error (SE)** | 0.38 | 0.42 | 0.18 | 0.20 | 0.54 | 0.14 | 0.36 | 0.32 | 0.56 | 0.09 |

**Source:** Epidural analgesia: Alberta Perinatal Health Program, July 2008 extraction
Forceps, Vacuum extraction: Hospital Inpatient Files, May 2008 extraction

**Notes:** Totals for Alberta include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.3.3.3 Epidural Analgesia, Forceps, and Vacuum Extraction Deliveries and Rates by Residence RHA and Year, Alberta, 2004 to 2006

| 2004 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 2,008 | 1,239 | 14,105 | 3,692 | 1,248 | 11,538 | 2,314 | 1,907 | 1,326 | 39,377 |
| **Epidural analgesia cases** | 637 | 92 | 7,326 | 641 | 412 | 6,269 | 642 | 188 | 444 | 16,651 |
| **Epidural analgesia rate (per 100 hospital deliveries)** | 31.7 | 7.4 | 51.9 | 17.4 | 33.0 | 54.3 | 27.7 | 9.9 | 33.5 | 42.3 |
| **Forceps deliveries** | 68 | 28 | 705 | 221 | 84 | 901 | 90 | 21 | 97 | 2,215 |
| **Forceps delivery rate (per 100 hospital deliveries)** | 3.4 | 2.3 | 5.0 | 6.0 | 6.7 | 7.8 | 3.9 | 1.1 | 7.3 | 5.6 |
| **Vacuum extraction deliveries** | 212 | 113 | 2,463 | 176 | 160 | 1,113 | 240 | 106 | 185 | 4,768 |
| **Vacuum extraction rate (per 100 hospital deliveries)** | 10.6 | 9.1 | 17.5 | 4.8 | 12.8 | 9.6 | 10.4 | 5.6 | 14.0 | 12.1 |

| 2005 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 2,038 | 1,302 | 14,830 | 3,746 | 1,229 | 11,635 | 2,341 | 2,002 | 1,326 | 40,449 |
| **Epidural analgesia cases** | 697 | 94 | 7,704 | 791 | 536 | 6,363 | 681 | 322 | 432 | 17,748 |
| **Epidural analgesia rate (per 100 hospital deliveries)** | 34.2 | 7.2 | 51.9 | 21.1 | 43.6 | 54.7 | 29.1 | 16.1 | 32.6 | 43.9 |
| **Forceps deliveries** | 112 | 19 | 676 | 179 | 88 | 901 | 89 | 36 | 103 | 2,203 |
| **Forceps delivery rate (per 100 hospital deliveries)** | 5.5 | 1.5 | 4.6 | 4.8 | 7.2 | 7.7 | 3.8 | 1.8 | 7.8 | 5.4 |
| **Vacuum extraction deliveries** | 203 | 81 | 2,390 | 170 | 174 | 847 | 239 | 161 | 172 | 4,437 |
| **Vacuum extraction rate (per 100 hospital deliveries)** | 10.0 | 6.2 | 16.1 | 4.5 | 14.2 | 7.3 | 10.2 | 8.0 | 13.0 | 11.0 |

| 2006 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 2,181 | 1,336 | 15,550 | 4,105 | 1,322 | 12,558 | 2,470 | 2,201 | 1,381 | 43,104 |
| **Epidural analgesia cases** | 745 | 82 | 8,115 | 933 | 597 | 7,014 | 625 | 317 | 466 | 19,064 |
| **Epidural analgesia rate (per 100 hospital deliveries)** | 34.2 | 6.1 | 52.2 | 22.7 | 45.2 | 55.9 | 25.3 | 14.4 | 33.7 | 44.2 |
| **Forceps deliveries** | 109 | 28 | 719 | 209 | 97 | 991 | 81 | 37 | 127 | 2,398 |
| **Forceps delivery rate (per 100 hospital deliveries)** | 5.0 | 2.1 | 4.6 | 5.1 | 7.3 | 7.9 | 3.3 | 1.7 | 9.2 | 5.6 |
| **Vacuum extraction deliveries** | 193 | 87 | 2,699 | 186 | 149 | 932 | 253 | 150 | 244 | 4,893 |
| **Vacuum extraction rate (per 100 hospital deliveries)** | 8.8 | 6.5 | 17.4 | 4.5 | 11.3 | 7.4 | 10.2 | 6.8 | 17.7 | 11.4 |

**Source:** Epidural analgesia: Alberta Perinatal Health Program, July 2008 extraction

Forceps, Vacuum extraction: Hospital Inpatient Files, May 2008 extraction

**Notes:** Totals for Alberta include unknown RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.3.3.4 Primary and Repeat Cesareans and VBACs and Rates, Alberta, 1997 to 2006

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 35,553 | 36,672 | 36,985 | 35,825 | 36,315 | 37,351 | 38,865 | 39,377 | 40,449 | 43,104 |
| **Cesarean sections** | 5,858 | 6,340 | 7,073 | 7,219 | 8,154 | 8,669 | 9,355 | 10,017 | 10,551 | 11,512 |
| **Cesarean rate (per 100 hospital deliveries)** | 16.5 | 17.3 | 19.1 | 20.2 | 22.5 | 23.2 | 24.1 | 25.4 | 26.1 | 26.7 |
| **Primary cesareans** | 3,848 | 4,177 | 4,719 | 4,829 | 5,401 | 5,655 | 6,088 | 6,395 | 6,637 | 7,055 |
| **Primary cesarean rate (per 100 hospital deliveries)** | 10.8 | 11.4 | 12.8 | 13.5 | 14.9 | 15.1 | 15.7 | 16.2 | 16.4 | 16.4 |
| **Repeat cesareans** | 2,010 | 2,163 | 2,354 | 2,390 | 2,753 | 3,014 | 3,267 | 3,622 | 3,914 | 4,457 |
| **Repeat cesarean rate (per 100 hospital deliveries)** | 5.7 | 5.9 | 6.4 | 6.7 | 7.6 | 8.1 | 8.4 | 9.2 | 9.7 | 10.3 |
| **VBAC attempts** | 1,836 | 1,880 | 1,702 | 1,594 | 1,594 | 1,445 | 1,511 | 1,458 | 1,418 | 1,412 |
| **VBAC attempt rate (per 100 VBACs and repeat cesareans)** | 52.3 | 51.0 | 45.6 | 43.8 | 40.1 | 35.6 | 34.7 | 31.3 | 28.6 | 25.5 |
| **VBAC occurrences** | 1,503 | 1,522 | 1,378 | 1,246 | 1,227 | 1,046 | 1,091 | 1,035 | 1,051 | 1,075 |
| **VBAC occurrence rate (per 100 VBACs and repeat cesareans)** | 42.8 | 41.3 | 36.9 | 34.3 | 30.8 | 25.8 | 25.0 | 22.2 | 21.2 | 19.4 |
| **VBAC success rate (per 100 attempted VBACs)** | 81.9 | 81.0 | 81.0 | 78.2 | 77.0 | 72.4 | 72.2 | 71.0 | 74.1 | 76.1 |

Table 3.3.3.5 VBACs and Cesarean Sections and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 6,227 | 3,877 | 44,485 | 11,543 | 3,799 | 35,731 | 7,125 | 6,110 | 4,033 | 122,930 |
| **Cesarean sections** | 1,440 | 938 | 12,236 | 3,143 | 1,020 | 9,160 | 1,751 | 1,412 | 980 | 32,080 |
| **Rate (per 100 hospital deliveries)** | 23.1 | 24.2 | 27.5 | 27.2 | 26.8 | 25.6 | 24.6 | 23.1 | 24.3 | 26.1 |
| **Standard Error (SE)** | 0.53 | 0.69 | 0.21 | 0.41 | 0.72 | 0.23 | 0.51 | 0.54 | 0.68 | 0.13 |
| **VBAC occurrences** | 190 | 74 | 1,108 | 293 | 137 | 895 | 160 | 144 | 160 | 3,161 |
| **VBAC occurrence rate (per 100 VBACs and repeat cesareans)** | 24.5 | 18.6 | 20.0 | 19.1 | 23.7 | 21.2 | 18.4 | 20.0 | 30.1 | 20.9 |
| **Standard Error (SE)** | 0.22 | 0.22 | 0.07 | 0.15 | 0.30 | 0.08 | 0.18 | 0.19 | 0.31 | 0.05 |

**Source:** Hospital Inpatient Files, May 2008 extraction

**Notes:** VBAC = vaginal birth after cesarean section
Data include Alberta residents only
Totals for Alberta include unknown RHAs
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.3.3.6 Primary and Repeat Cesareans and VBACs and Rates, by Residence RHA, Alberta, 2004 to 2006

| 2004 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 2,008 | 1,239 | 14,105 | 3,692 | 1,248 | 11,538 | 2,314 | 1,907 | 1,326 | 39,377 |
| **Cesarean sections** | 446 | 292 | 3,757 | 1,019 | 364 | 2,868 | 540 | 436 | 295 | 10,017 |
| **Cesarean rate (per 100 hospital deliveries)** | 22.2 | 23.6 | 26.6 | 27.6 | 29.2 | 24.9 | 23.3 | 22.9 | 22.2 | 25.4 |
| **Primary cesareans** | 265 | 187 | 2,488 | 613 | 222 | 1,851 | 320 | 266 | 183 | 6,395 |
| **Primary cesarean rate (per 100 hospital deliveries)** | 13.2 | 15.1 | 17.6 | 16.6 | 17.8 | 16.0 | 13.8 | 13.9 | 13.8 | 16.2 |
| **Repeat cesareans** | 181 | 105 | 1,269 | 406 | 142 | 1,017 | 220 | 170 | 112 | 3,622 |
| **Repeat cesarean rate (per 100 hospital deliveries)** | 9.0 | 8.5 | 9.0 | 11.0 | 11.4 | 8.8 | 9.5 | 8.9 | 8.4 | 9.2 |
| **VBAC attempts** | 69 | 36 | 543 | 127 | 45 | 446 | 70 | 48 | 74 | 1,458 |
| **VBAC attempt rate (per 100 VBACs and repeat cesareans)** | 29.1 | 28.3 | 33.0 | 25.5 | 24.7 | 33.8 | 25.7 | 23.3 | 43.8 | 31.3 |
| **VBAC occurrences** | 56 | 22 | 376 | 93 | 40 | 303 | 52 | 36 | 57 | 1,035 |
| **VBAC ocurrence rate (per 100 VBACs and repeat cesareans)** | 23.6 | 17.3 | 22.9 | 18.6 | 22.0 | 23.0 | 19.1 | 17.5 | 33.7 | 22.2 |
| **VBAC success rate (per 100 attempted VBACs)** | 81.2 | 61.1 | 69.2 | 73.2 | 88.9 | 67.9 | 74.3 | 75.0 | 77.0 | 71.0 |

| 2005 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 2,038 | 1,302 | 14,830 | 3,746 | 1,229 | 11,635 | 2,341 | 2,002 | 1,326 | 40,449 |
| **Cesarean sections** | 459 | 308 | 4,118 | 987 | 333 | 3,005 | 584 | 453 | 304 | 10,551 |
| **Cesarean rate (per 100 hospital deliveries)** | 22.5 | 23.7 | 27.8 | 26.3 | 27.1 | 25.8 | 24.9 | 22.6 | 22.9 | 26.1 |
| **Primary cesareans** | 279 | 203 | 2,644 | 600 | 185 | 1,899 | 360 | 284 | 183 | 6,637 |
| **Primary cesarean rate (per 100 hospital deliveries)** | 13.7 | 15.6 | 17.8 | 16.0 | 15.1 | 16.3 | 15.4 | 14.2 | 13.8 | 16.4 |
| **Repeat cesareans** | 180 | 105 | 1,474 | 387 | 148 | 1,106 | 224 | 169 | 121 | 3,914 |
| **Repeat cesarean rate (per 100 hospital deliveries)** | 8.8 | 8.1 | 9.9 | 10.3 | 12.0 | 9.5 | 9.6 | 8.4 | 9.1 | 9.7 |
| **VBAC attempts** | 85 | 36 | 510 | 129 | 57 | 404 | 70 | 66 | 61 | 1,418 |
| **VBAC attempt rate (per 100 VBACs and repeat cesareans)** | 34.1 | 27.5 | 27.9 | 26.5 | 29.5 | 29.0 | 24.6 | 29.3 | 35.5 | 28.6 |
| **VBAC occurrences** | 69 | 26 | 356 | 99 | 45 | 288 | 61 | 56 | 51 | 1,051 |
| **VBAC ocurrence rate (per 100 VBACs and repeat cesareans)** | 27.7 | 19.8 | 19.5 | 20.4 | 23.3 | 20.7 | 21.4 | 24.9 | 29.7 | 21.2 |
| **VBAC success rate (per 100 attempted VBACs)** | 81.2 | 72.2 | 69.8 | 76.7 | 78.9 | 71.3 | 87.1 | 84.8 | 83.6 | 74.1 |

| 2006 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 2,181 | 1,336 | 15,550 | 4,105 | 1,322 | 12,558 | 2,470 | 2,201 | 1,381 | 43,104 |
| **Cesarean sections** | 535 | 338 | 4,361 | 1,137 | 323 | 3,287 | 627 | 523 | 381 | 11,512 |
| **Cesarean rate (per 100 hospital deliveries)** | 24.5 | 25.3 | 28.0 | 27.7 | 24.4 | 26.2 | 25.4 | 23.8 | 27.6 | 26.7 |
| **Primary cesareans** | 310 | 225 | 2,683 | 686 | 173 | 2,089 | 362 | 285 | 242 | 7,055 |
| **Primary cesarean rate (per 100 hospital deliveries)** | 14.2 | 16.8 | 17.3 | 16.7 | 13.1 | 16.6 | 14.7 | 12.9 | 17.5 | 16.4 |
| **Repeat cesareans** | 225 | 113 | 1,678 | 451 | 150 | 1,198 | 265 | 238 | 139 | 4,457 |
| **Repeat cesarean rate (per 100 hospital deliveries)** | 10.3 | 8.5 | 10.8 | 11.0 | 11.3 | 9.5 | 10.7 | 10.8 | 10.1 | 10.3 |
| **VBAC attempts** | 85 | 32 | 533 | 126 | 60 | 375 | 60 | 68 | 73 | 1,412 |
| **VBAC attempt rate (per 100 VBACs and repeat cesareans)** | 29.3 | 23.0 | 25.9 | 22.8 | 29.7 | 25.0 | 19.2 | 23.4 | 38.2 | 25.5 |
| **VBAC occurrences** | 65 | 26 | 376 | 101 | 52 | 304 | 47 | 52 | 52 | 1,075 |
| **VBAC ocurrence rate (per 100 VBACs and repeat cesareans)** | 22.4 | 18.7 | 18.3 | 18.3 | 25.7 | 20.2 | 15.1 | 17.9 | 27.2 | 19.4 |
| **VBAC success rate (per 100 attempted VBACs)** | 76.5 | 81.3 | 70.5 | 80.2 | 86.7 | 81.1 | 78.3 | 76.5 | 71.2 | 76.1 |

**Source:** Hospital Inpatient Files, May 2008 extraction

**Notes:** VBAC = vaginal birth after cesarean section

Totals for Alberta include unknown RHAs

Data include Alberta residents only

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.3.3.7 Episiotomy Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 5,875 | 5,625 | 5,215 | 5,017 | 4,684 | 4,383 | 4,263 |
| **Number of vaginal deliveries** | 28,865 | 28,468 | 29,075 | 30,076 | 30,184 | 30,638 | 32,427 |
| **Rate (per 100 vaginal deliveries)** | 20.4 | 19.8 | 17.9 | 16.7 | 15.5 | 14.3 | 13.1 |
| **Standard Error (SE)** | 0.24 | 0.24 | 0.23 | 0.21 | 0.21 | 0.20 | 0.19 |

Table 3.3.3.8 Episiotomy Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 935 | 2,973 | 4,380 | 3,513 | 1,263 | 252 | 13,330 |
| **Number of vaginal deliveries** | 5,438 | 19,515 | 30,219 | 25,757 | 10,338 | 1,837 | 93,212 |
| **Rate (per 100 vaginal deliveries)** | 17.2 | 15.2 | 14.5 | 13.6 | 12.2 | 13.7 | 14.3 |
| **Standard Error (SE)** | 0.51 | 0.26 | 0.20 | 0.21 | 0.32 | 0.80 | 0.11 |

Table 3.3.3.9 Episiotomy Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 541 | 441 | 3,711 | 1,207 | 519 | 4,865 | 672 | 523 | 759 | 13,330 |
| **Number of vaginal deliveries** | 4,824 | 2,992 | 33,344 | 8,433 | 2,765 | 27,127 | 5,329 | 4,690 | 3,051 | 93,249 |
| **Rate (per 100 vaginal deliveries)** | 11.2 | 14.7 | 11.1 | 14.3 | 18.8 | 17.9 | 12.6 | 11.2 | 24.9 | 14.3 |
| **Standard Error (SE)** | 0.45 | 0.65 | 0.17 | 0.38 | 0.74 | 0.23 | 0.45 | 0.46 | 0.78 | 0.11 |

**Source:** Alberta Perinatal Health Program, September 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.3.3.10 Shoulder Dystocia Cases and Rate by Year, Alberta, 1997 to 2006

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Shoulder dystocia cases** | 546 | 659 | 786 | 986 | 1,129 | 1,222 | 1,418 | 1,433 | 1,674 | 2,079 |
| **Live births** | 36,550 | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 |
| **Rate (per 100 live births)** | 1.5 | 1.8 | 2.1 | 2.7 | 3.0 | 3.2 | 3.6 | 3.6 | 4.0 | 4.7 |
| **Standard Error (SE)** | 0.06 | 0.07 | 0.07 | 0.08 | 0.09 | 0.09 | 0.09 | 0.09 | 0.10 | 0.10 |

Table 3.3.3.11 Shoulder Dystocia Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Shoulder dystocia cases** | 272 | 965 | 1,713 | 1,422 | 612 | 102 | 5,186 |
| **Live births** | 6,545 | 24,482 | 39,808 | 36,692 | 15,904 | 3,105 | 126,539 |
| **Rate (per 100 live births)** | 4.2 | 3.9 | 4.3 | 3.9 | 3.8 | 3.3 | 4.1 |
| **Standard Error (SE)** | 0.25 | 0.12 | 0.10 | 0.10 | 0.15 | 0.32 | 0.06 |

Table 3.3.3.12 Shoulder Dystocia Cases and Rate by RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births** | 6,396 | 3,991 | 46,379 | 11,863 | 2,871 | 37,152 | 7,365 | 6,333 | 4,186 | 126,539 |
| **Shoulder dystocia cases** | 240 | 406 | 1,960 | 370 | 230 | 1,182 | 334 | 248 | 216 | 5,186 |
| **Rate (per 100 live births)** | 3.8 | 10.2 | 4.2 | 3.1 | 8.0 | 3.2 | 4.5 | 3.9 | 5.2 | 4.1 |
| **Standard Error (SE)** | 0.24 | 0.48 | 0.09 | 0.16 | 0.51 | 0.09 | 0.24 | 0.24 | 0.34 | 0.06 |

**Sources:** Alberta Health and Wellness. Fee for Service Claims File. August 2008 extraction.
Alberta Health and Wellness. Ambulatory Care Classification System (ACCS). August 2008 extraction.
Alberta Health and Wellness. Inpatient Hospital Morbidity Data. August 2008 extraction.
Alberta Health and Wellness. Alberta Health Care Insurance Plan(AHCIP) Registration File. August 2008 extraction.

**Notes:** Data include Alberta residents only.
Totals for age groups include unknown ages.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

# *3. Pregnancies*

## *3.4 Maternal Factors*

*3.4.1 Maternal Age*
*3.4.2 Maternal Pre-Pregnancy Conditions*
*3.4.3 Maternal Prenatal Morbidity*
*3.4.4 Maternal Prenatal Smoking*
*3.4.5 Maternal Prenatal Alcohol Consumption*
*3.4.6 Maternal Prenatal Street Drug Use*
*3.4.7 Maternal Prenatal HIV and HBV Screening*

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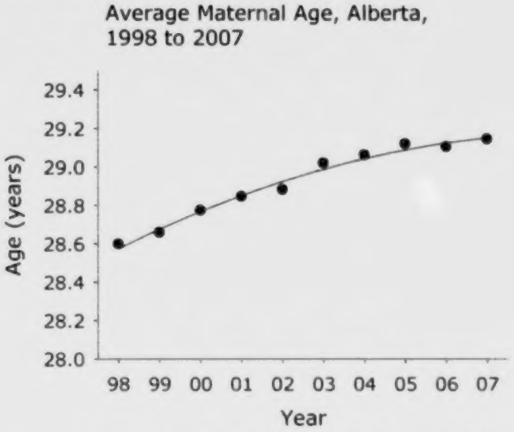
## 3.4.1 Maternal Age

Maternal age refers to *the age of the mother in years at the time of the event in question (e.g., live birth, stillbirth, spontaneous abortion, etc.)*. Average maternal age calculations used exact maternal age (e.g., 28.2 years), whereas groupings by maternal age group used mother's age at last birthday (e.g., 28 years).

A Canadian study showed that teenage first-time mothers were more likely than 25 to 29 year old first-time mothers to have high school education or less, to live in low income households, to be single parents, to smoke throughout pregnancy, to never breastfeed, and were less likely to breastfeed for more than six months if they did breastfeed. Teenage mothers were less likely to have gestational diabetes than 25 to 29 year old mothers, however. First-time mothers 35 or older, compared to 25 to 29 year old first-time mothers, were more likely to have gestational hypertension, cesarean delivery, preterm birth, and were more likely to breastfeed for more than 6 months (Bushnik & Garner, 2008). Mothers 35 and older have also been found to have decreased fertility and increased rates of spontaneous abortion, chromosomal abnormalities, multiple birth, and stillbirth (Heffner, 2004; Tough, Newburn-Cook, Johnston, Svenson, Rose, & Belik, 2002).

U.S. data suggest that adolescents are delaying sexual activity longer, using contraception more often, and using more effective methods of contraception, resulting in declining teen pregnancy rates (Abma, Martinez, Mosher, & Dawson, 2004).

### Time Trends (see Table 3.4.1.1)



- The average maternal age for all live births increased from 28.6 years in 1998 to 29.1 years in 2007.
- The average age at first live birth was 27.4 years in 2007, up from 26.7 in 1998.
- In 2007, the average maternal age for multiple live births was 31.0, compared with 29.1 for singleton live births.
- The percentage of women over 35 giving birth to live infants increased from 13.3% in 1998 to 15.4% in 2007.

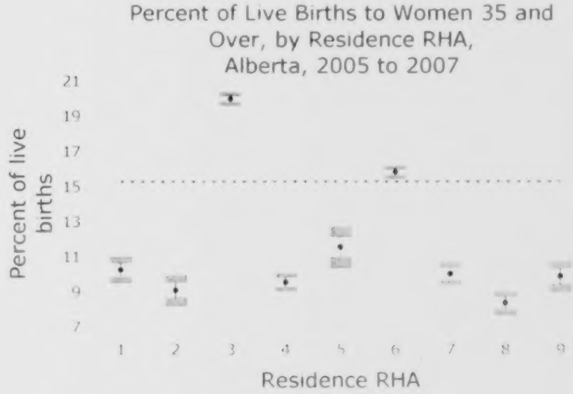
### Relationships to Other Indicators (see Table 3.4.1.2)

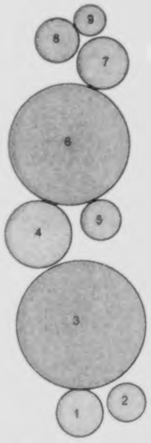
- Some measures decrease with maternal age for women under 35. This applies to prenatal smoking, alcohol consumption, and drug dependence. Mothers under 25 years of age (especially teen mothers) are most likely to engage in these risk behaviours.
- Some indicators show an increase with increasing maternal age. This can be seen in the rates of multiple birth and midwife attendance, both of which are most common in the oldest mothers. Large-for-gestational-age infants are slightly more common with increasing maternal age.
- Other indicators have a U-shaped relationship with maternal age, such as small-for-gestational age, low birth weight, preterm birth, and stillbirth. In these cases, the highest rates occur in the younger and older mothers, with lower rates for intermediate maternal age groups.

# 3.4.1 Maternal Age

## Regional Data (see Tables 3.4.1.3, 3.4.1.4)

- For 2005 to 2007 combined, average maternal age was lower than the provincial average in all RHAs except RHAs 3 and 6 (the major metropolitan areas), where it was higher than the provincial mean.
  - The highest average maternal age for all live births was in RHA 3 (30.4 years); this was more than three years higher than the average in RHA 8 (27.2 years).


Percent of Live Births to Women 35 and Over, by Residence RHA, Alberta, 2005 to 2007



- The highest percentage of of live births to women 35 and over was also highest in RHAs 3 and 6, particularly 3, where one in five women giving birth between 2005 and 2007 was at least 35 years old.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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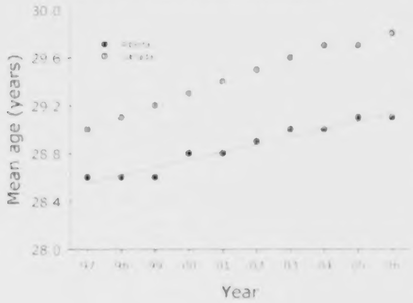
### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data


Mean maternal age, Alberta and Canada, 1997 to 2006

Percent of Live Births to Women 35 Years Old and Over, 2005-07 Combined

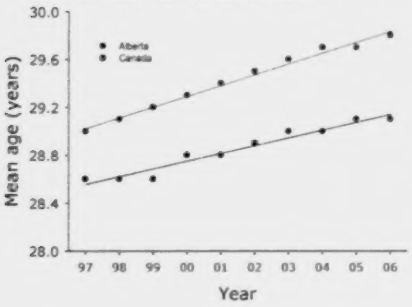
9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

# 3.4.1 Maternal Age

Maternal age has increased in both Alberta and Canada over recent years. Women giving birth to live infants are about 8 months younger in Alberta than in Canada, on average. In 2006, the mean maternal age was 29.8 years in Canada and 29.1 years in Alberta (Statistics Canada, 2008a).

Mean maternal age, Alberta and Canada, 1997 to 2006

Source: Statistics Canada (1999a,b, 2000, 2002, 2005b)

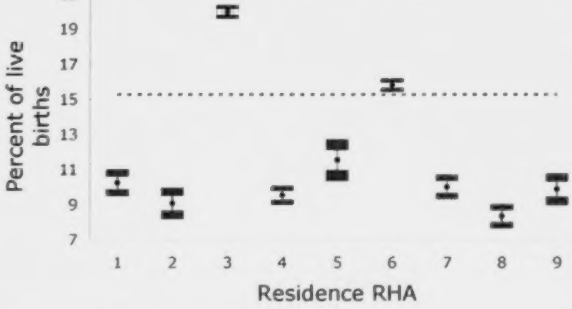


Percent of Live Births to Women 35 Years Old and Over, 2005-07 Combined

## Regional Data (see Tables 3.4.1.3, 3.4.1.4)

- For 2005 to 2007 combined, average maternal age was lower than the provincial average in all RHAs except RHAs 3 and 6 (the major metropolitan areas), where it was higher than the provincial mean.
  - The highest average maternal age for all live births was in RHA 3 (30.4 years); this was more than three years higher than the average in RHA 8 (27.2 years).

Percent of Live Births to Women 35 and Over, by Residence RHA, Alberta, 2005 to 2007



- The highest percentage of of live births to women 35 and over was also highest in RHAs 3 and 6, particularly 3, where one in five women giving birth between 2005 and 2007 was at least 35 years old.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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## Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 3.4.1.1 Mean Maternal Age for Selected Types of Birth and Percent of Women 35 and Older Giving Birth to Live Infants, by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **All live births** | 28.6 | 28.7 | 28.8 | 28.8 | 28.9 | 29.0 | 29.1 | 29.1 | 29.1 | 29.1 |
| **First live birth** | 26.7 | 26.7 | 26.9 | 27.0 | 27.0 | 27.3 | 27.4 | 27.4 | 27.4 | 27.4 |
| **Singleton live birth** | 28.5 | 28.6 | 28.7 | 28.8 | 28.8 | 29.0 | 29.0 | 29.1 | 29.0 | 29.1 |
| **Multiple live birth** | 30.5 | 30.6 | 30.5 | 30.6 | 30.5 | 30.6 | 30.9 | 30.7 | 30.8 | 31.0 |
| **Stillbirth** | 28.7 | 29.1 | 28.9 | 29.8 | 29.5 | 28.7 | 29.1 | 29.5 | 30.2 | 30.4 |
| **Percent of live births to women 35+** | 13.3 | 14.2 | 14.7 | 14.6 | 14.5 | 14.9 | 14.8 | 15.1 | 15.2 | 15.4 |

Table 3.4.1.2 Selected Indicators by Maternal Age Group, Alberta, 2005 - 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | Total |
|---|---|---|---|---|---|---|---|
| **Smoking during pregnancy rate (per 100 women delivering)**[1] | 48.8 | 34.4 | 17.2 | 10.1 | 10.6 | 11.2 | 19.1 |
| **Alcohol consumption during pregnancy rate (per 100 women delivering)**[1] | 8.3 | 4.3 | 1.7 | 1.1 | 1.3 | 1.0 | 2.3 |
| **Drug dependence rate (per 100 women delivering)**[1] | 5.3 | 2.9 | 0.9 | 0.6 | 0.8 | 0.7 | 1.4 |
| **Small-for-gestational-age singleton rate (per 100 singleton live births)** | 8.9 | 8.9 | 8.0 | 7.5 | 7.5 | 8.5 | 8.0 |
| **Large for gestational age singleton rate (per 100 singleton live births)** | 10.9 | 10.2 | 10.8 | 11.3 | 12.4 | 12.0 | 11.1 |
| **Mean birth weight for singleton term births** | 3,334 | 3,347 | 3,360 | 3,350 | 3,332 | 3,274 | 3,348 |
| **Low birth weight rate (per 100 live births)** | 7.8 | 6.4 | 6.0 | 6.8 | 7.7 | 9.7 | 6.7 |
| **High birth weight rate (per 100 live births)** | 11.4 | 10.9 | 11.2 | 11.0 | 11.3 | 11.0 | 11.1 |
| **Preterm rate (per 100 live births)** | 9.6 | 8.2 | 8.1 | 8.9 | 9.9 | 12.2 | 8.8 |
| **Multiple birth rate (per 100 live births)** | 1.8 | 2.1 | 2.8 | 3.9 | 4.4 | 6.1 | 3.2 |
| **Midwife attendant rate (per 1,000 live births)** | 2.3 | 5.3 | 9.7 | 13.1 | 15.3 | 18.4 | 10.2 |
| **Stillbirths (per 1,000 total births)** | 9.6 | 6.5 | 5.2 | 6.6 | 10.0 | 17.8 | 7.0 |

Table 3.4.1.3 Mean Maternal Age and Percent of Live Births to Women 35 and Older, by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **All live births** | 27.8 | 27.6 | 30.4 | 27.6 | 28.3 | 29.3 | 27.3 | 27.2 | 27.5 | 29.1 |
| **Percent of live births to women 35+** | 10.2 | 9.1 | 20.0 | 9.5 | 11.5 | 15.8 | 10.0 | 8.3 | 9.9 | 15.2 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release
Alberta Perinatal Health Program, August 2008 release

**Notes:** Only births for which maternal age is known are included
1 Only live births with available information on maternal smoking, alcohol consumption or drug dependence are included
Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.4.1.4 Mean Maternal Age and Percent of Births to Women 35 and Older by Residence RHA, Alberta, 1998 to 2007

| Mean maternal age | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 27.4 | 27.4 | 27.8 | 27.6 | 27.7 | 27.7 | 27.8 | 27.9 | 27.8 | 27.6 |
| Palliser | 27.5 | 27.4 | 27.4 | 27.6 | 27.5 | 27.8 | 27.7 | 27.8 | 27.6 | 27.6 |
| Calgary | 29.7 | 29.8 | 29.8 | 30.0 | 30.0 | 30.2 | 30.2 | 30.4 | 30.4 | 30.4 |
| David Thompson | 27.6 | 27.4 | 27.5 | 27.4 | 27.7 | 27.5 | 27.7 | 27.6 | 27.5 | 27.7 |
| East Central | 28.4 | 28.4 | 28.4 | 28.5 | 28.6 | 28.3 | 28.4 | 28.3 | 28.5 | 28.0 |
| Capital | 28.8 | 29.0 | 29.0 | 29.1 | 29.1 | 29.3 | 29.3 | 29.3 | 29.4 | 29.4 |
| Aspen | 27.2 | 27.0 | 27.3 | 27.3 | 27.4 | 27.4 | 27.2 | 27.4 | 27.2 | 27.3 |
| Peace Country | 26.7 | 26.9 | 26.9 | 27.1 | 27.1 | 27.0 | 27.3 | 27.2 | 27.1 | 27.3 |
| Northern Lights | 26.7 | 26.6 | 27.0 | 27.1 | 26.9 | 27.4 | 27.3 | 27.3 | 27.6 | 27.5 |
| Alberta | 28.6 | 28.7 | 28.8 | 28.8 | 28.9 | 29.0 | 29.1 | 29.1 | 29.1 | 29.1 |

| Percent of live births to women 35+ | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 9.3 | 9.7 | 11.4 | 10.8 | 11.4 | 10.7 | 11.5 | 11.3 | 9.6 | 9.9 |
| Palliser | 8.9 | 8.3 | 7.9 | 8.9 | 10.0 | 9.1 | 9.9 | 9.8 | 8.4 | 9.0 |
| Calgary | 17.1 | 18.5 | 18.6 | 18.7 | 18.3 | 19.3 | 18.7 | 19.7 | 19.8 | 20.3 |
| David Thompson | 9.5 | 9.8 | 10.0 | 10.0 | 10.5 | 9.5 | 10.1 | 9.9 | 9.0 | 9.7 |
| East Central | 11.1 | 11.0 | 12.9 | 12.2 | 12.2 | 11.7 | 11.6 | 11.4 | 13.4 | 9.9 |
| Capital | 14.1 | 15.6 | 15.3 | 15.2 | 15.3 | 15.6 | 15.5 | 15.2 | 16.1 | 16.0 |
| Aspen | 8.7 | 8.1 | 11.0 | 9.4 | 9.7 | 10.1 | 9.2 | 10.7 | 9.4 | 9.9 |
| Peace Country | 8.0 | 8.6 | 9.2 | 9.0 | 8.5 | 8.2 | 9.0 | 8.4 | 7.9 | 8.8 |
| Northern Lights | 8.5 | 6.8 | 9.6 | 9.6 | 7.9 | 9.8 | 8.9 | 8.9 | 10.8 | 9.9 |
| Alberta | 13.3 | 14.2 | 14.7 | 14.6 | 14.5 | 14.9 | 14.8 | 15.1 | 15.2 | 15.4 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

## 3.4.2 Maternal Pre-Pregnancy Conditions

Maternal obesity: *Pre-pregnancy weight of more than 91 kg.*

Diabetes (diabetes mellitus): *A chronic syndrome of impaired carbohydrate, protein, and fat metabolism owing to insufficient secretion of insulin or to target tissue insulin resistance. Diabetes occurs in two major forms: Type 1 diabetes mellitus and Type 2 diabetes mellitus* (Dorland, 2000).

Heart disease: *Any organic, mechanical, or functional abnormality of the heart, its structures, or the coronary arteries (Dorland, 2000).* This category includes women diagnosed with asymptomatic or symptomatic heart disease.

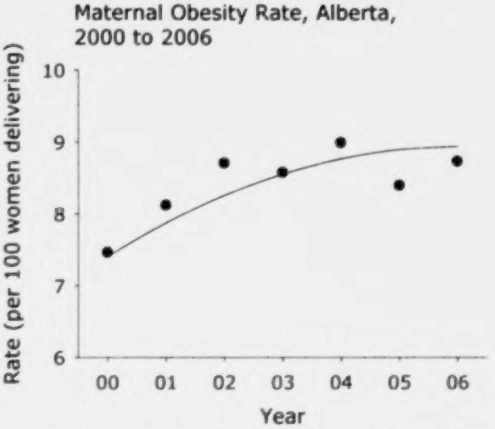
Hypertension: *High arterial blood pressure, diagnosed [illegible] in pregnancy.* In this case, this includes women who had blood pressure of 140/90 or higher, or women who were using antihypertensive drugs.

Chronic renal disease: *Any disease of the kidney persisting over a long period of time.*

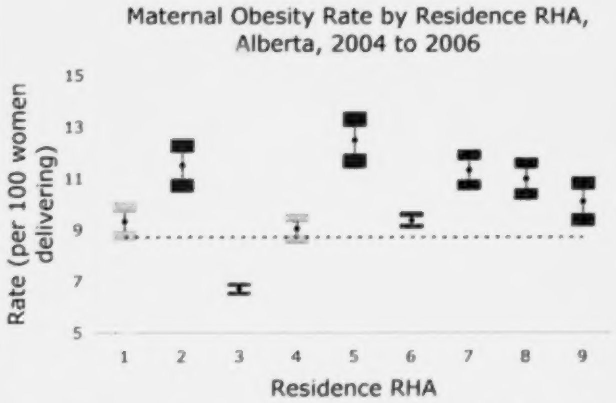
Rates for the above measures are expressed in percent of women delivering (live births or stillbirths).

Obesity during pregnancy is associated with increased rates of infertility, hypertension, gestational diabetes, postpartum hemorrhage, and cesarean section in mothers. Fetal complications associated with obesity include increase risk of macrosomia, fetal death, stillbirth, congenital anomalies, and admission to neonatal intensive care. Obese mothers are less likely to initiate breastfeeding and discontinue sooner than non-obese women (Arendas, Qiu, & Gruslin, 2008).

### Pre-Pregnancy Maternal Obesity (see Tables 3.4.2.1 to .3)



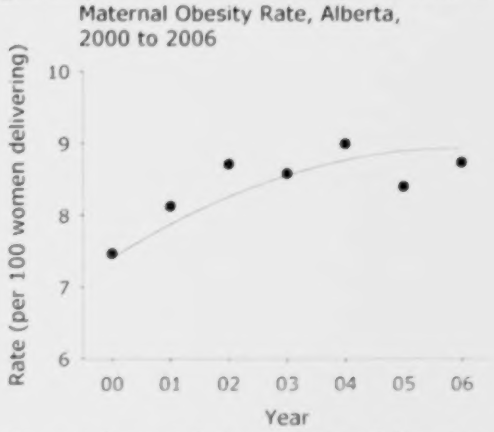
- While the rate of maternal obesity increased from 2000 to 2002, it has been fairly stable since then. 8.7% of Alberta women giving birth in 2006 weighed more than 91 kg prior to pregnancy.
- The rate of maternal obesity was lowest in mothers under the age of 20 and over the age of 39 between 2004 and 2006.



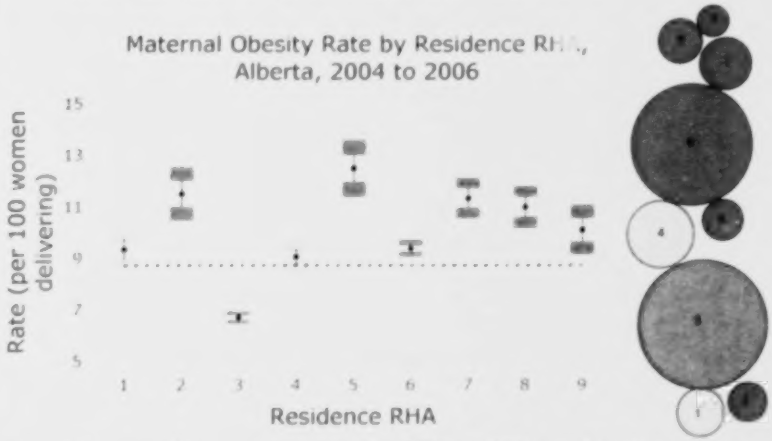
- The rate of maternal obesity for 2004 to 2006 combined was lower than the provincial average in RHA 3 (6.7% of women). The maternal obesity rate was higher than the provincial average in RHAs 2, 5, 6, 7, 8, and 9, with the highest rate (12.5%) in RHA 5.

# 3.4.2 Maternal Pre-Pregnancy Conditions

## Pre-Pregnancy Maternal Obesity (see Tables 3.4.2.1 to .3)


Maternal Obesity Rate, Alberta, 2000 to 2006

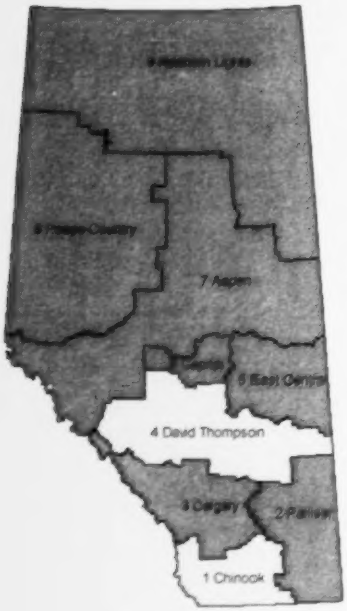
- While the rate of maternal obesity increased from 2000 to 2002, it has been fairly stable since then. 8.7% of Alberta women giving birth in 2006 weighed more than 91 kg prior to pregnancy.
- The rate of maternal obesity was lowest in mothers under the age of 20 and over the age of 39 between 2004 and 2006.


Maternal Obesity Rate by Residence RHA, Alberta, 2004 to 2006

- The rate of maternal obesity for 2004 to 2006 combined was lower than the provincial average in RHA 3 (6.7% of women). The maternal obesity rate was higher than the provincial average in RHAs 2, 5, 6, 7, 8, and 9, with the highest rate (12.5%) in RHA 5.

# 3.4.2 Maternal Pre-Pregnancy Conditions

Pre-Pregnancy Maternal Obesity Rate, 2004-06 Combined



## Pre-Pregnancy Diabetes (see Tables 3.4.2.4 to.5)

- Pre-pregnancy diabetes was reported in 0.7% of women giving birth in Alberta in 2006. This rate did not vary between 2000 and 2006.
- Rates of pre-pregnancy diabetes increased with increasing maternal age for 2004 to 2006 combined. Women over 39 years of age had a rate of pre-conception diabetes of 1.2%.

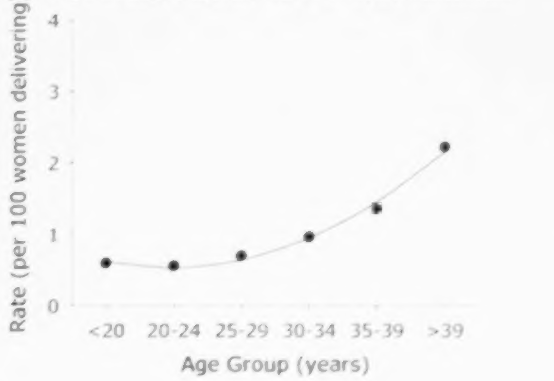
## Pre-pregnancy heart disease (see Tables 3.4.2.6 to .7)

- The rate of pre-pregnancy heart disease in women giving birth between 2004 and 2006 in Alberta was 0.6%. There was no time trend in this rate between 2000 and 2006.
- There was little variation in pre-pregnancy heart disease rates across maternal age groups for 2004 to 2006 combined.

## Pre-pregnancy hypertension (see Tables 3.4.2.8 to .9)

- Pre-existing hypertension occurred in 0.9% of Alberta women giving birth in 2006; the rate did not vary with time.

Pre-Pregnancy Hypertension Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined



- Pre-pregnancy hypertension was clearly more common in older mothers, with a rate of 2.2% in women over 39 for 2004 to 2006 combined, compared with 0.6% for women under 25 years of age.

## 3.4.2 Maternal Pre-Pregnancy Conditions

Pre-Pregnancy Maternal Obesity Rate, 2004-06 Combined

4 David Thompson
1 Chinook

Women with pre-pregnancy diabetes have increased risk of pregnancy complications (e.g., preterm delivery, macrosomic infants, hypoglycemia) and adverse birth outcomes (e.g., congenital anomalies, stillbirth, perinatal mortality; CEMACH, 2007).

Women with heart disease have elevated rates of neonatal risk and cardiac events during pregnancy. In one study of Canadian women with cardiac disease, 13% had a cardiac event during pregnancy (primarily pulmonary edema or cardiac arrhythmia), and the rates of fetal or neonatal death and preterm birth were elevated (Siu et al., 2001).

### Pre-Pregnancy Diabetes (see Tables 3.4.2.4 to.5)

- Pre-pregnancy diabetes was reported in 0.7% of women giving birth in Alberta in 2006. This rate did not vary between 2000 and 2006.
- Rates of pre-pregnancy diabetes increased with increasing maternal age for 2004 to 2006 combined. Women over 39 years of age had a rate of pre-conception diabetes of 1.2%.

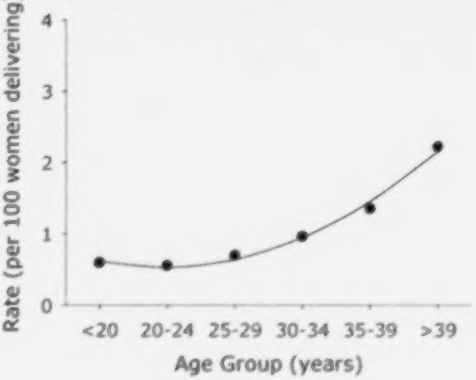
### Pre-pregnancy heart disease (see Tables 3.4.2.6 to .7)

- The rate of pre-pregnancy heart disease in women giving birth between 2004 and 2006 in Alberta was 0.6%. There was no time trend in this rate between 2000 and 2006.
- There was little variation in pre-pregnancy heart disease rates across maternal age groups for 2004 to 2006 combined.

### Pre-pregnancy hypertension (see Tables 3.4.2.8 to .9)

- Pre-existing hypertension occurred in 0.9% of Alberta women giving birth in 2006; the rate did not vary with time.

Pre-Pregnancy Hypertension Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined



- Pre-pregnancy hypertension was clearly more common in older mothers, with a rate of 2.2% in women over 39 for 2004 to 2006 combined, compared with 0.6% for women under 25 years of age.

## 3.4.2 Maternal Pre-Pregnancy Conditions

Hypertension in pregnancy is a risk factor for preeclampsia, gestational diabetes, and placental abruption (Zetterstrom et al., 2005). In a large study of women giving birth in Nova Scotia, women with pre-existing hypertension were 2.5 times more likely to give birth to an infant who was small-for-gestational age and 3.2 times more likely to have a stillbirth than women without hypertension (Allen, Joseph, Murphy, Magee, and Ohlsson, 2004).

Kidney disease can result in maternal morbidity (including maternal hypertension, pre-eclampsia, and abruptio placenta), perinatal morbidity (e.g., preterm birth, low birth weight) or mortality (maternal or perinatal). Risks are proportional to the severity of renal dysfunction (Fischer et al., 2004; Sanders & Lucas, 2001). Maternal renal function may decline after pregnancy in women with kidney disease (Davison, 2001).

### Pre-pregnancy renal disease (see Table 3.4.2.10)

- Chronic renal disease prior to pregnancy was very rare, with a rate of 0.1% each year from 2000 to 2006.

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### Limitations and Methodology Notes

**Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.**

**Regional data were excluded for all measures except Maternal Obesity due to low numbers of cases.**

Table 3.4.2.1 Pre-Pregnancy Maternal Obesity Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 2,619 | 2,939 | 3,278 | 3,367 | 3,599 | 3,418 | 3,794 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 7.5 | 8.1 | 8.7 | 8.6 | 9.0 | 8.4 | 8.7 |
| **Standard Error (SE)** | 0.14 | 0.14 | 0.15 | 0.14 | 0.14 | 0.14 | 0.14 |

Table 3.4.2.2 Pre-Pregnancy Maternal Obesity Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 335 | 2,038 | 3,657 | 3,161 | 1,378 | 230 | 10,811 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 5.2 | 8.5 | 9.4 | 8.8 | 8.8 | 7.5 | 8.7 |
| **Standard Error (SE)** | 0.28 | 0.18 | 0.15 | 0.15 | 0.23 | 0.48 | 0.08 |

Table 3.4.2.3 Pre-Pregnancy Maternal Obesity Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 574 | 441 | 3,047 | 987 | 464 | 3,400 | 756 | 667 | 401 | 10,811 |
| **Number of women** | 6,160 | 3,841 | 45,553 | 10,929 | 3,722 | 36,366 | 6,688 | 6,081 | 3,980 | 124,246 |
| **Rate (per 100 women delivering)** | 9.3 | 11.5 | 6.7 | 9.0 | 12.5 | 9.3 | 11.3 | 11.0 | 10.1 | 8.7 |
| **Standard Error (SE)** | 0.37 | 0.51 | 0.12 | 0.27 | 0.54 | 0.15 | 0.39 | 0.40 | 0.48 | 0.08 |

**Source:** Alberta Perinatal Health Program, September 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.2.4 Pre-Pregnancy Diabetes Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 257 | 279 | 217 | 233 | 236 | 253 | 313 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 0.7 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 |
| **Standard Error (SE)** | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 |

Table 3.4.2.5 Pre-Pregnancy Diabetes Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 11 | 138 | 183 | 276 | 156 | 38 | 802 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 0.2 | 0.6 | 0.5 | 0.8 | 1.0 | 1.2 | 0.6 |
| **Standard Error (SE)** | 0.05 | 0.05 | 0.03 | 0.05 | 0.08 | 0.20 | 0.02 |

**Source:** Alberta Perinatal Health Program, September 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups include unknown ages.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.2.6 Pre-Pregnancy Heart Disease Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 246 | 284 | 275 | 329 | 287 | 296 | 250 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 0.7 | 0.8 | 0.7 | 0.8 | 0.7 | 0.7 | 0.6 |
| **Standard Error (SE)** | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 | 0.04 | 0.04 |

Table 3.4.2.7 Pre-Pregnancy Heart Disease Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 28 | 127 | 252 | 266 | 136 | 23 | 832 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 0.4 | 0.5 | 0.6 | 0.7 | 0.9 | 0.7 | 0.7 |
| **Standard Error (SE)** | 0.08 | 0.05 | 0.04 | 0.05 | 0.07 | 0.16 | 0.02 |

**Source:** Alberta Perinatal Health Program, September 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups include unknown ages.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.2.8 Pre-Pregnancy Hypertension Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 227 | 289 | 324 | 324 | 311 | 367 | 387 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 0.6 | 0.8 | 0.9 | 0.8 | 0.8 | 0.9 | 0.9 |
| **Standard Error (SE)** | 0.04 | 0.05 | 0.05 | 0.05 | 0.04 | 0.05 | 0.05 |

Table 3.4.2.9 Pre-Pregnancy Hypertension Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 38 | 132 | 271 | 344 | 211 | 68 | 1,065 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 0.6 | 0.6 | 0.7 | 1.0 | 1.3 | 2.2 | 0.9 |
| **Standard Error (SE)** | 0.10 | 0.05 | 0.04 | 0.05 | 0.09 | 0.27 | 0.03 |

**Source:** Alberta Perinatal Health Program, September 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups include unknown ages.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 3.4.2.10 Pre-Pregnancy Renal Disease Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 39 | 34 | 42 | 33 | 39 | 38 | 45 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| **Standard Error (SE)** | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 |

**Source:** Alberta Perinatal Health Program, September 2008 release.

**Notes:** Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

# 3.4.3 Maternal Prenatal Morbidity

Gestational diabetes: *Diabetes mellitus with onset or first recognition during pregnancy; this category does not include diabetics who become pregnant* (Dorland, 2000).

Pregnancy-induced hypertension: *High arterial blood pressure with onset during pregnancy.*

Prenatal bleeding: *Uterine bleeding during pregnancy.* In this case, bleeding is classified as occurring prior to 20 weeks gestation, at 20 weeks gestation or later, or at both before and after 20 weeks gestation.

Rates for the above measures are expressed in percent of women delivering (live births or stillbirths).

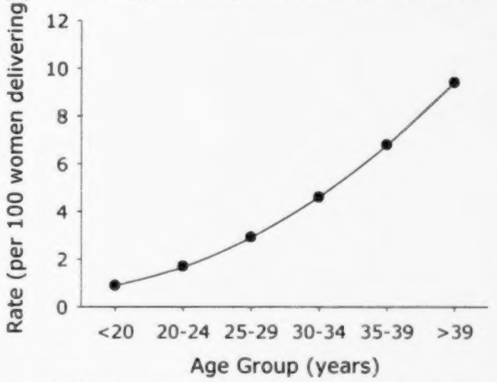
Mothers with gestational diabetes are at increased risk for recurrence in a subsequent pregnancy, and for development of type 2 diabetes. Children of women with gestational diabetes are at increased risk for obesity and abnormal glucose metabolism (Metzger, 2007). Lifestyle and dietary habits as well as genetic factors are associated with the rising prevalence of gestational diabetes (Bottalico, 2007).

Pregnancy-induced hypertension (PIH) is more common than pre-existing hypertension. A large study of women giving birth in Nova Scotia found that women with PIH were 1.6 times more likely to give birth to a small-for-gestational-age infant and 1.4 times more likely to have a stillbirth than women without hypertension (Allen, Joseph, Murphy, Magee, and Ohlsson, 2004).

## Gestational diabetes (see Tables 3.4.3.1 to .3)

- The provincial gestational diabetes rate was 3.9% in 2006, up from 3.2% in 2000.

Gestational Diabetes Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined



- Gestational diabetes rates clearly increase with increasing maternal age. Between 2004 and 2006, the rate for women over 39 was 9.4%, more than ten times the rate for teen mothers (0.9%).
- For 2004 to 2006 combined, the rate of gestational diabetes was higher than the provincial average in RHAs 3 and 6 and lower than the provincial average in all other RHAs except RHA 2.

## Pregnancy-Induced hypertension (see Tables 3.4.3.4 to .6)

- Pregnancy-induced hypertension was reported for 5.7% of Alberta women giving birth in 2006. The rate rose slightly in 2005 and 2006 compared to 2001 to 2004, when it was steady at 5.4%.
- The rate of pregnancy-induced hypertension increased with maternal age for 2004 to 2006 combined, from 5.1% in women under 20 to 6.9% in women over 39.
- Between 2004 and 2006, the rate of pregnancy-induced hypertension was lower than the provincial average in RHAs 1, 2, 6, and 8, with the lowest rate in RHA 2 (4.0%). The rate was higher than the provincial average in RHAs 3 and 5, with the highest rate in RHA 5 (6.6%).

## 3.4.3 Maternal Prenatal Morbidity

Bleeding during early pregnancy may be indicative of ectopic pregnancy, spontaneous abortion, incompetent cervix, placental abnormalities, genital infection, trauma or systemic disease. Adverse outcomes include preterm birth, low birth weight, and perinatal death. Older mothers, mothers with prior preterm births, and women exposed to cigarette smoke are at risk (Yang et al., 2005).

Bleeding late in pregnancy may caused by serious conditions such as placenta previa (in which the placenta is implanted near or over the cervical opening), placental abruption (in which the placenta separates from the uterus prior to delivery), and, less commonly, vasa previa (in which fetal blood vessels are between the cervix and the fetus). Each of these conditions has the potential for maternal or fetal death if not properly diagnosed and treated (Sakornbut, Leeman, and Fontaine, 2007).

### Prenatal bleeding (see Tables 3.4.3.7 to .12)

- Prenatal bleeding before 20 weeks gestation was reported in 5.8% of women giving birth in 2006. This rate did not vary greatly with maternal age, though teen mothers were least likely to report this condition (4.0%). The rate was below the provincial average in the northern half of the province (RHAs 6, 7, 8, and 9), and above the provincial average in the southern half of the province (RHAs 1, 2, 3, and 4).
- Prenatal bleeding after 20 weeks gestation was reported in fewer women—3.5% in 2006, with no time trend from 2000 to 2006. Women over 39 years of age were most likely to report bleeding after 20 weeks gestation (5.1%) between 2004 and 2006. Rates were lower than the provincial average in RHAs 6, 7, and 9 during this time period, and higher in RHAs 1, 2, and 4.
- Just 0.8% of women experienced prenatal bleeding both before and after 20 weeks gestation, with very little variation in the rate over time, maternal age, or RHA.

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### Limitations and Methodology Notes

Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

### Table 3.4.3.1 Gestational Diabetes Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 1,133 | 1,123 | 1,371 | 1,282 | 1,462 | 1,432 | 1,713 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 3.2 | 3.1 | 3.6 | 3.3 | 3.7 | 3.5 | 3.9 |
| **Standard Error (SE)** | 0.09 | 0.09 | 0.10 | 0.09 | 0.09 | 0.09 | 0.09 |

### Table 3.4.3.2 Gestational Diabetes Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 57 | 407 | 1,142 | 1,648 | 1,062 | 289 | 4,607 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 0.9 | 1.7 | 2.9 | 4.6 | 6.8 | 9.4 | 3.7 |
| **Standard Error (SE)** | 0.12 | 0.08 | 0.09 | 0.11 | 0.20 | 0.53 | 0.05 |

### Table 3.4.3.3 Gestational Diabetes Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 192 | 148 | 1,926 | 307 | 93 | 1,484 | 174 | 168 | 90 | 4,607 |
| **Number of women** | 6,160 | 3,841 | 45,553 | 10,929 | 3,722 | 36,366 | 6,688 | 6,081 | 3,980 | 124,246 |
| **Rate (per 100 women delivering)** | 3.1 | 3.9 | 4.2 | 2.8 | 2.5 | 4.1 | 2.6 | 2.8 | 2.3 | 3.7 |
| **Standard Error (SE)** | 0.22 | 0.31 | 0.09 | 0.16 | 0.26 | 0.10 | 0.19 | 0.21 | 0.24 | 0.05 |

**Source:** Alberta Perinatal Health Program, September 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

### Table 3.4.3.4 Pregnancy-Induced Hypertension Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 1,716 | 1,955 | 2,017 | 2,135 | 2,147 | 2,241 | 2,497 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 4.9 | 5.4 | 5.4 | 5.4 | 5.4 | 5.5 | 5.7 |
| **Standard Error (SE)** | 0.12 | 0.12 | 0.12 | 0.11 | 0.11 | 0.11 | 0.11 |

### Table 3.4.3.5 Pregnancy-Induced Hypertension Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 329 | 1,213 | 2,132 | 2,034 | 963 | 211 | 6,885 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 5.1 | 5.1 | 5.5 | 5.7 | 6.2 | 6.9 | 5.5 |
| **Standard Error (SE)** | 0.27 | 0.14 | 0.11 | 0.12 | 0.19 | 0.46 | 0.06 |

### Table 3.4.3.6 Pregnancy-Induced Hypertension Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 282 | 152 | 2,809 | 604 | 245 | 1,889 | 359 | 254 | 232 | 6,885 |
| **Number of women** | 6,160 | 3,841 | 45,553 | 10,929 | 3,722 | 36,366 | 6,688 | 6,081 | 3,980 | 124,246 |
| **Rate (per 100 women delivering)** | 4.6 | 4.0 | 6.2 | 5.5 | 6.6 | 5.2 | 5.4 | 4.2 | 5.8 | 5.5 |
| **Standard Error (SE)** | 0.27 | 0.31 | 0.11 | 0.22 | 0.41 | 0.12 | 0.28 | 0.26 | 0.37 | 0.06 |

**Source:** Alberta Perinatal Health Program, September 2008 release

**Notes:** Data include Alberta residents only

Totals for age groups and RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.4.3.7 Bleeding Before 20 Weeks Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 2,072 | 2,021 | 2,222 | 2,418 | 2,426 | 2,291 | 2,517 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 1,000 women)** | 5.9 | 5.6 | 5.9 | 6.2 | 6.1 | 5.6 | 5.8 |
| **Standard Error (SE)** | 0.13 | 0.12 | 0.12 | 0.12 | 0.12 | 0.11 | 0.11 |

Table 3.4.3.8 Bleeding Before 20 Weeks Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 258 | 1,285 | 2,360 | 2,173 | 958 | 198 | 7,324 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 1,000 women)** | 4.0 | 5.4 | 6.0 | 6.1 | 6.1 | 6.4 | 5.9 |
| **Standard Error (SE)** | 0.24 | 0.15 | 0.12 | 0.13 | 0.19 | 0.44 | 0.07 |

Table 3.4.3.9 Bleeding Before 20 Weeks Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 809 | 388 | 2,809 | 816 | 203 | 1,527 | 199 | 319 | 116 | 7,234 |
| **Number of women** | 6,160 | 3,841 | 45,553 | 10,929 | 3,722 | 36,366 | 6,688 | 6,081 | 3,980 | 124,246 |
| **Rate (per 1,000 women)** | 13.1 | 10.1 | 6.2 | 7.5 | 5.5 | 4.2 | 3.0 | 5.2 | 2.9 | 5.8 |
| **Standard Error (SE)** | 0.43 | 0.49 | 0.11 | 0.25 | 0.37 | 0.11 | 0.21 | 0.29 | 0.27 | 0.07 |

**Source:** Alberta Perinatal Health Program, September 2008 release

**Notes:** Data include Alberta residents only

Totals for age groups and RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.4.3.9 Bleeding After 20 Weeks Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 1,195 | 1,172 | 1,229 | 1,518 | 1,437 | 1,428 | 1,509 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 3.4 | 3.2 | 3.3 | 3.9 | 3.6 | 3.5 | 3.5 |
| **Standard Error (SE)** | 0.10 | 0.09 | 0.09 | 0.10 | 0.09 | 0.09 | 0.09 |

Table 3.4.3.10 Bleeding After 20 Weeks Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 260 | 858 | 1,324 | 1,199 | 574 | 156 | 4,374 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 4.0 | 3.6 | 3.4 | 3.3 | 3.7 | 5.1 | 3.5 |
| **Standard Error (SE)** | 0.25 | 0.12 | 0.09 | 0.09 | 0.15 | 0.40 | 0.05 |

Table 3.4.3.12 Bleeding After 20 Weeks Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 392 | 185 | 1,663 | 455 | 113 | 1,110 | 168 | 193 | 67 | 4,374 |
| **Number of women** | 6,160 | 3,841 | 45,553 | 10,929 | 3,722 | 36,366 | 6,688 | 6,081 | 3,980 | 124,246 |
| **Rate (per 100 women delivering)** | 6.4 | 4.8 | 3.7 | 4.2 | 3.0 | 3.1 | 2.5 | 3.2 | 1.7 | 3.5 |
| **Standard Error (SE)** | 0.31 | 0.35 | 0.09 | 0.19 | 0.28 | 0.09 | 0.19 | 0.22 | 0.20 | 0.05 |

**Source:** Alberta Perinatal Health Program, September 2008 release

**Notes:** Data include Alberta residents only

Totals for age groups and RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 3.4.3.11 Bleeding Before and After 20 Weeks Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 249 | 239 | 244 | 324 | 313 | 311 | 345 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 0.7 | 0.7 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 |
| **Standard Error (SE)** | 0.04 | 0.04 | 0.04 | 0.05 | 0.04 | 0.04 | 0.04 |

Table 3.4.3.12 Bleeding Before and After 20 Weeks Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 36 | 171 | 318 | 272 | 142 | 29 | 969 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 0.6 | 0.7 | 0.8 | 0.8 | 0.9 | 0.9 | 0.8 |
| **Standard Error (SE)** | 0.09 | 0.05 | 0.05 | 0.05 | 0.08 | 0.17 | 0.02 |

Table 3.4.3.15 Bleeding Before and After 20 Weeks Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 125 | 38 | 348 | 112 | 25 | 237 | 31 | 35 | 12 | 969 |
| **Number of women** | 6,160 | 3,841 | 45,553 | 10,929 | 3,722 | 36,366 | 6,688 | 6,081 | 3,980 | 124,246 |
| **Rate (per 100 women delivering)** | 2.0 | 1.0 | 0.8 | 1.0 | 0.7 | 0.7 | 0.5 | 0.6 | 0.3 | 0.8 |
| **Standard Error (SE)** | 0.18 | 0.16 | 0.04 | 0.10 | 0.13 | 0.04 | 0.08 | 0.10 | 0.09 | 0.02 |

**Source:** Alberta Perinatal Health Program. September 2008 release

**Notes:** Data include Alberta residents only

Totals for age groups and RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

# 3.4.4 Maternal Prenatal Smoking

Smokers are *women who reported smoking cigarettes at some point during pregnancy*. The rate of maternal prenatal smoking is reported as percent of women delivering.

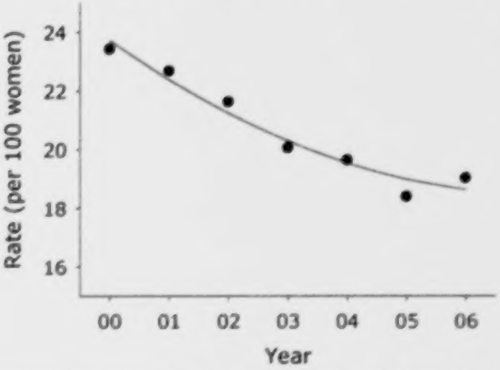
Among smokers, fertility rates are lower while rates of ectopic pregnancy, spontaneous abortion, placental abruption, and placenta previa are higher than among non-smokers. Children of mothers who smoke during pregnancy are at increased risk of fetal growth restriction, preterm birth, perinatal and neonatal mortality, oral-facial clefts, sudden infant death syndrome, and later problems such as conduct disorder, substance abuse, depression, hyperactivity, attention, and cognitive impairments (Cnattingius, 2004; Shea and Steiner, 2008).

Risk factors for smoking during pregnancy in Canada include Aboriginal ethnicity, low income, young maternal age (particularly under 20), and heavy smoking prior to pregnancy (Devries & Greaves, 2004).

Smoking cessation programs during pregnancy are most successful when they consist of a combination of counseling and behavioural interventions. Smoking cessation during pregnancy has positive effects on low birth weight, preterm birth, and infant morbidity rates (Crawford, Tolosa, and Goldenberg, 2008).

## Time Trends (see Table 3.4.4.1)

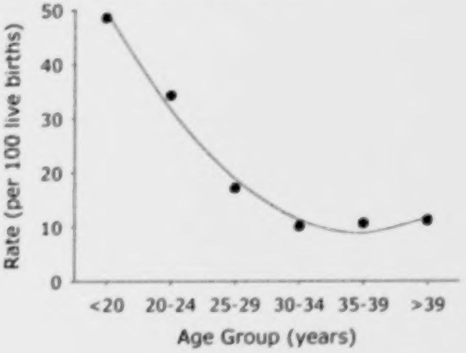
Maternal Prenatal Smoking Rate, Alberta, 2000 to 2006



- The maternal prenatal smoking rate declined from 23.4% in 2000 to 18.4% in 2005. In 2006, 8,268 mothers reported smoking during pregnancy, for a rate of 19.0%.

## Maternal Age Trends (see Table 3.4.4.2)

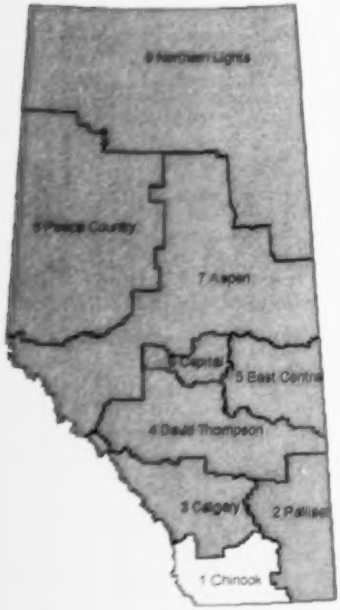
Maternal Prenatal Smoking Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined



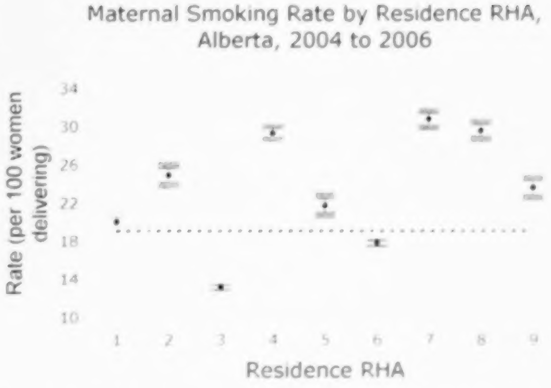
- Young mothers are far more likely to report smoking during pregnancy than are older mothers. For 2004 to 2006 combined, 48.5% of teenage mothers smoked during pregnancy. In the 20 to 24 year age group, one in three women (34.2%) reported prenatal smoking. The lowest rate was for women 30 to 34 years of age (10.1%).

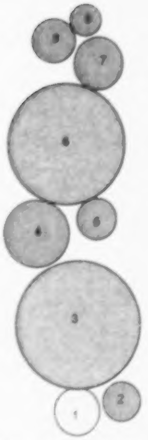
# 3.4.4 Maternal Prenatal Smoking

Maternal Prenatal Smoking Rate,
2004-06 Combined



## Regional Data (see Table 3.4.4.3)





- For 2004 to 2006 combined, maternal prenatal smoking rates were lower than the provincial average in RHAs 3 and 6, with the lowest rate in RHA 3 (13.1 per 100 live births).
- The rate was higher than the provincial average in RHAs 2, 4, 5, 7, 8, and 9. The highest rate was 30.8, in RHA 7.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

Maternal prenatal smoking data are self reported, and thus are subject to the biases inherent in such data (e.g., inaccurate reporting due to social desirability issues).

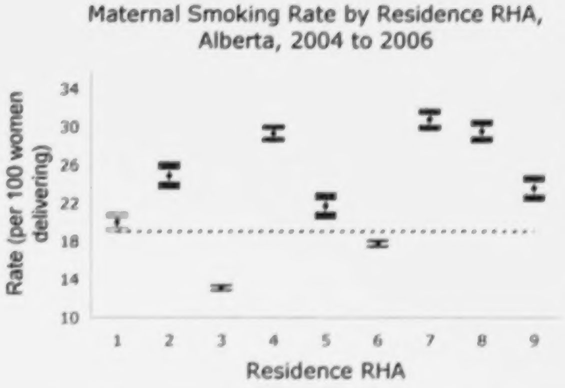
Data on maternal smoking, alcohol consumption, and drug dependence were derived from the Alberta Delivery Record. This is a different source from our previous reports; these data are thus not comparable to those appearing in previous reports. Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

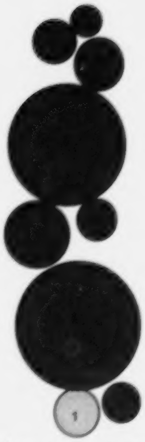
# 3.4.4 Maternal Prenatal Smoking

In a 2007 survey, 23.1% of 20-24 year old women who had been pregnant in the last five years reported smoking during pregnancy, compared with 8.5% of women over 24 (Health Canada, 2008a).

Maternal Prenatal Smoking Rate, 2004-06 Combined

## Regional Data (see Table 3.4.4.3)





- For 2004 to 2006 combined, maternal prenatal smoking rates were lower than the provincial average in RHAs 3 and 6, with the lowest rate in RHA 3 (13.1 per 100 live births).
- The rate was higher than the provincial average in RHAs 2, 4, 5, 7, 8, and 9. The highest rate was 30.8, in RHA 7.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

Maternal prenatal smoking data are self-reported, and thus are subject to the biases inherent in such data (e.g., inaccurate reporting due to social desirability issues).

Data on maternal smoking, alcohol consumption, and drug dependence were derived from the Alberta Delivery Record. This is a different source from our previous reports; these data are thus not comparable to those appearing in previous reports. Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

Table 3.4.4.1 Maternal Prenatal Smoking Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 8,223 | 8,209 | 8,144 | 7,879 | 7,866 | 7,490 | 8,268 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 23.4 | 22.7 | 21.6 | 20.1 | 19.6 | 18.4 | 19.0 |
| **Standard Error (SE)** | 0.23 | 0.22 | 0.21 | 0.20 | 0.20 | 0.19 | 0.19 |

Table 3.4.4.2 Maternal Prenatal Smoking Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 3,118 | 8,199 | 6,681 | 3,608 | 1,653 | 342 | 23,624 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 48.5 | 34.2 | 17.1 | 10.1 | 10.6 | 11.1 | 19.0 |
| **Standard Error (SE)** | 0.62 | 0.31 | 0.19 | 0.16 | 0.25 | 0.57 | 0.11 |

Table 3.4.4.3 Maternal Prenatal Smoking Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 1,231 | 956 | 5,976 | 3,203 | 808 | 6,467 | 2,057 | 1,795 | 938 | 23,624 |
| **Number of women** | 6,160 | 3,841 | 45,553 | 10,929 | 3,722 | 36,366 | 6,688 | 6,081 | 3,980 | 124,246 |
| **Rate (per 100 women delivering)** | 20.0 | 24.9 | 13.1 | 29.3 | 21.7 | 17.8 | 30.8 | 29.5 | 23.6 | 19.0 |
| **Standard Error (SE)** | 0.51 | 0.70 | 0.16 | 0.44 | 0.68 | 0.20 | 0.56 | 0.58 | 0.67 | 0.11 |

**Source:** Alberta Perinatal Health Program, September 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

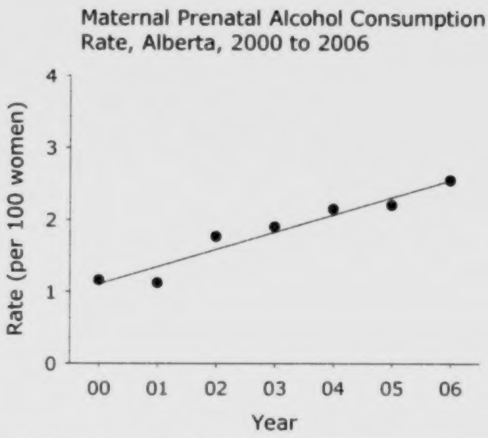
## 3.4.5 Maternal Prenatal Alcohol Consumption

Maternal prenatal alcohol consumption: *Self-report of three or more drinks on any one occasion during pregnancy or one or more drinks per day throughout pregnancy*. The rate of maternal prenatal alcohol consumption is reported as percent of women delivering.

The proportion of infants exposed to alcohol prenatally is substantial. Some women consume alcohol after they are aware they are pregnant. Tough, Tofflemire, Clarke, and Newburn-Cook (2005) found that 50% of first time Alberta mothers reported alcohol consumption before their pregnancies were recognized, including 11% of women who reported binge drinking (5 or more drinks during a 24 hour period). After their pregnancies were confirmed, 18% of women (almost one in five) continued to consume alcohol. These women were more likely to be between 30 and 39 years old, Caucasian, and smokers, than women who did not drink once their pregnancies were confirmed.

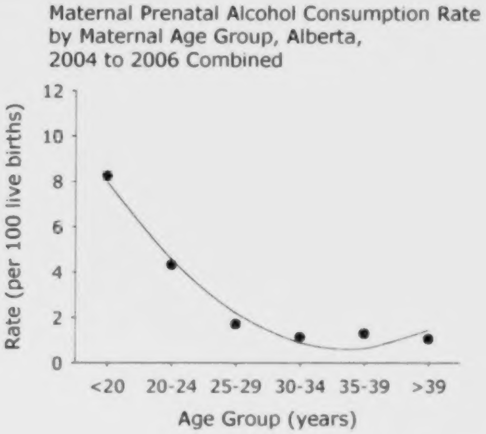
Among the most severe outcomes of maternal prenatal alcohol consumption is fetal alcohol spectrum disorder (FASD). FASD can result in lifelong physical, mental, behavioural, and learning disabilities, including growth restriction, intellectual disability, birth defects, and dysmorphic facial features (Chudley et al., 2005). FASD is the leading preventable cause of mental disorder in the western world (Tough, Clarke, and Clarren, 2005).

### Time Trends (see Table 3.4.5.1)



- In 2006, 2.5% of women giving birth reported that they had had three or more drinks on any one occasion during pregnancy or one or more drinks per day throughout pregnancy. This rate increased from 1.2% in 2000.
- These rates are lower than figures reported in the Background. This is likely due in part to differences in data collection methods and definitions of alcohol use.

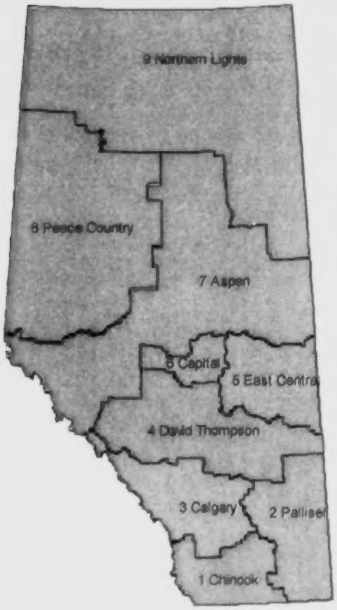
### Age Effects (see Table 3.4.5.2)



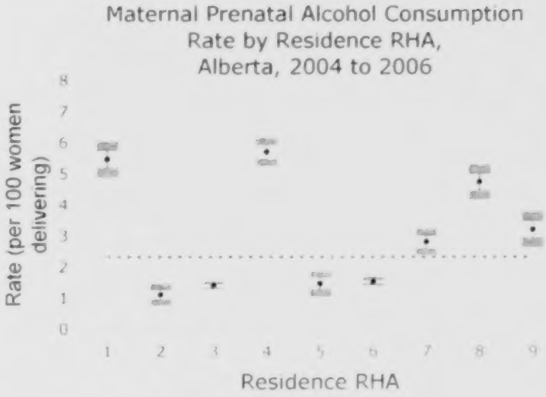
- Young mothers are more likely than older mothers to report drinking alcohol when pregnant.
- Between 2004 and 2006, 8.2% of teenage mothers reported drinking while pregnant, compared with less than 2% of mothers 25 and older.

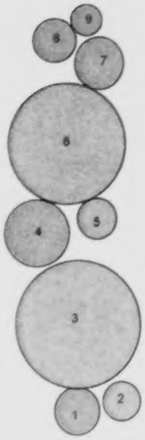
# 3.4.5 Maternal Prenatal Alcohol Consumption

Maternal Prenatal Alcohol Consumption Rate, 2004-06 Combined



## Regional Data (See Table 3.4.5.3)





- Between 2004 and 2006, the rate of alcohol consumption during pregnancy was lower than the provincial average in RHAs 2, 3, 5, and 6. The lowest reported rate was in RHA 2 (1.1%).
- The prenatal alcohol consumption rate was higher than the provincial average in RHAs 1, 4, 7, 8, and 9. The highest rate was in RHA 4 (5.7% of live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

### Limitations and Methodology Notes

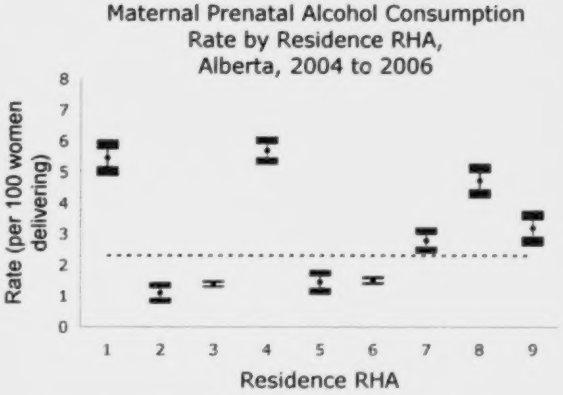
Maternal prenatal alcohol consumption data are self-reported, and thus are subject to the biases inherent in such data (e.g., inaccurate reporting due to social desirability issues).

Data on maternal smoking, alcohol consumption, and drug dependence were derived from the Alberta Delivery Record. This is a different source from our previous reports; these data are thus not comparable to those appearing in previous reports. Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

# 3.4.5 Maternal Prenatal Alcohol Consumption

Maternal Prenatal Alcohol Consumption Rate, 2004-06 Combined

## Regional Data (See Table 3.4.5.3)



- Between 2004 and 2006, the rate of alcohol consumption during pregnancy was lower than the provincial average in RHAs 2, 3, 5, and 6. The lowest reported rate was in RHA 2 (1.1%)
- The prenatal alcohol consumption rate was higher than the provincial average in RHAs 1, 4, 7, 8, and 9. The highest rate was in RHA 4 (5.7% of live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

Maternal prenatal alcohol consumption data are self-reported, and thus are subject to the biases inherent in such data (e.g., inaccurate reporting due to social desirability issues).

Data on maternal smoking, alcohol consumption, and drug dependence were derived from the Alberta Delivery Record. This is a different source from our previous reports; these data are thus not comparable to those appearing in previous reports. Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

Table 3.4.5.1 Maternal Prenatal Alcohol Consumption Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 405 | 404 | 663 | 744 | 858 | 896 | 1,106 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 1.2 | 1.1 | 1.8 | 1.9 | 2.1 | 2.2 | 2.5 |
| **Standard Error (SE)** | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 | 0.07 | 0.08 |

Table 3.4.5.2 Maternal Prenatal Alcohol Consumption Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 529 | 1,034 | 662 | 402 | 200 | 32 | 2,860 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 8.2 | 4.3 | 1.7 | 1.1 | 1.3 | 1.0 | 2.3 |
| **Standard Error (SE)** | 0.34 | 0.13 | 0.07 | 0.06 | 0.09 | 0.18 | 0.04 |

Table 3.4.5.3 Maternal Prenatal Alcohol Consumption Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 336 | 42 | 631 | 622 | 54 | 547 | 187 | 287 | 127 | 2,860 |
| **Number of women** | 6,160 | 3,841 | 45,553 | 10,929 | 3,722 | 36,366 | 6,688 | 6,081 | 3,980 | 124,246 |
| **Rate (per 100 women delivering)** | 5.5 | 1.1 | 1.4 | 5.7 | 1.5 | 1.5 | 2.8 | 4.7 | 3.2 | 2.3 |
| **Standard Error (SE)** | 0.29 | 0.17 | 0.05 | 0.22 | 0.20 | 0.06 | 0.20 | 0.27 | 0.28 | 0.04 |

**Source:** Alberta Perinatal Health Program, September 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

## 3.4.6 Maternal Prenatal Drug Dependence

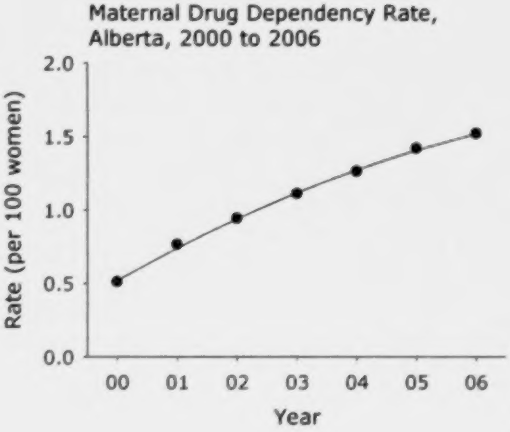
Maternal prenatal street drug use: *Self report of drug dependency during pregnancy.* The rate of maternal prenatal drug dependence is reported as percent of women delivering.

Drug lifestyles, abusive relationships, employment problems, depression, child care issues, poverty, and homelessness are some of the ongoing health, social, mental health, and legal problems faced by women who use drugs during pregnancy (AADAC, 2004, 2006). Many use more than one substance, making it difficult to associate outcomes with a single drug.

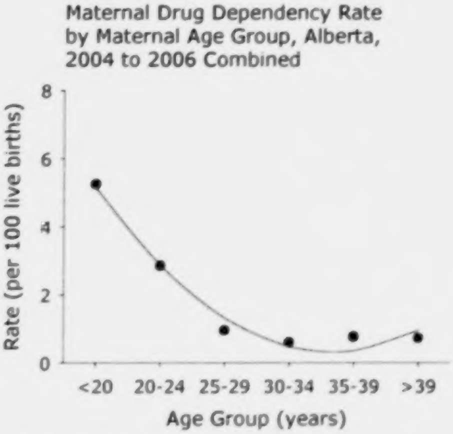
Marijuana and cocaine are the drugs most often used by women using street drugs during pregnancy. Infants born to marijuana users may be lethargic, with impaired visual responses, and decreased startle reflexes (Wagner et al., 1998). Tetrahydrocannabinol (THC; the active ingredient in marijuana) crosses the placenta and levels in breast milk are up to eight times higher than in maternal blood (Kozer & Koren, 2001).

In a large study, infants exposed to cocaine in utero were, on average, born 1.2 weeks earlier, weighed 536 grams less, were 2.6 cm shorter, and had head circumferences 1.5 cm smaller than infants not exposed to cocaine. The cocaine-exposed infants displayed more nervous system symptoms (e.g., jitteriness, irritability) and had more infections (e.g., hepatitis, HIV, and syphilis). Long-term neurodevelopment, behaviour, and learning effects of cocaine exposure are also documented (Bauer et al., 2005).

**Time Trends** (see Table 3.4.6.1)



- In 2006, 1.5% of Alberta women who gave birth (661 women) reported drug dependence during pregnancy. This is triple the rate of 0.5% reported in 2000. The rate increased every year from 2000 to 2006.
- This is an alarming increase in the rate of a dangerous prenatal maternal behaviour.

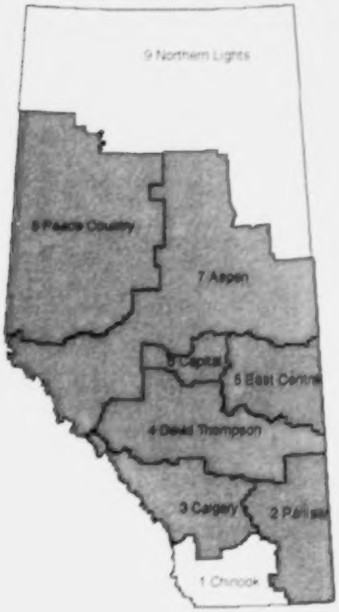


**Age Effects** (see Table 3.4.6.2)

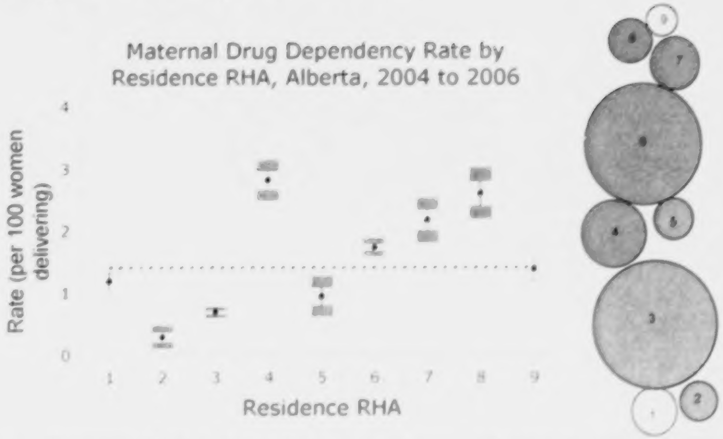
- Among women under the age of 20, 5.2% reported drug dependence for 2004 to 2006 combined, or more than one in twenty women.
- The rate of drug dependence was less than one percent in mothers 25 years old and older during this time period.

# 3.4.6 Maternal Prenatal Drug Dependence

Maternal Prenatal Drug Dependence Rate, 2004-06 Combined



## Regional Data (See Table 3.4.6.3)


Maternal Drug Dependency Rate by Residence RHA, Alberta, 2004 to 2006

- Between 2004 and 2006, the rate of maternal drug dependence was lower than the provincial average in RHAs 2, 3, and 5, with the lowest rate in RHA 3 (0.7%).
- The rate was higher than the provincial average in RHAs 4, 6, 7, and 8. RHA 4 had the highest rate (2.8%).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

## Limitations and Methodology Notes

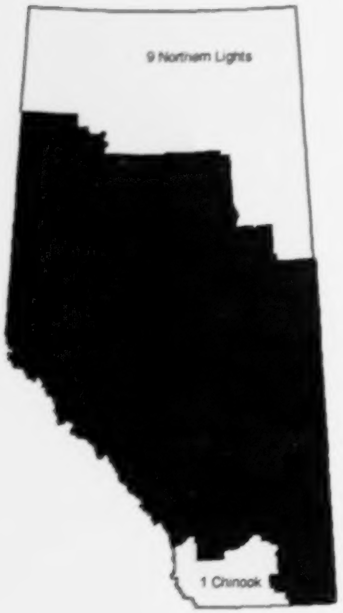
Prenatal drug dependence data are self-reported, and thus are subject to the biases inherent in such data (e.g., inaccurate reporting due to social desirability issues).

Data on maternal smoking, alcohol consumption, and drug dependence were derived from the Alberta Delivery Record. This is a different source from our previous reports; these data are thus not comparable to those appearing in previous reports. Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

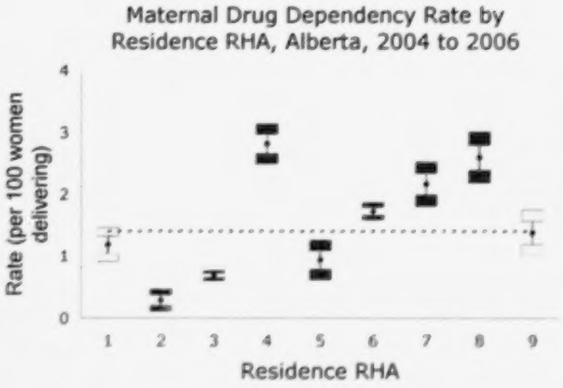
# 3.4.6 Maternal Prenatal Drug Dependence

Women who abuse substances face a number of barriers to effective treatment, including denial that there is a problem, denying the risks involved, not knowing how or where to get treatment, and fear of having their children taken away if they seek treatment. These barriers may lead them to avoid prenatal care entirely. Many physicians do not effectively screen their patients for substance use, or are uncertain about how to help such women (AADAC, 2006).

Maternal Prenatal Drug Dependence Rate, 2004-06 Combined



## Regional Data (See Table 3.4.6.3)



- Between 2004 and 2006, the rate of maternal drug dependence was lower than the provincial average in RHAs 2, 3, and 5, with the lowest rate in RHA 3 (0.7%).
- The rate was higher than the provincial average in RHAs 4, 6, 7, and 8. RHA 4 had the highest rate (2.8%).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

Prenatal drug dependence data are self-reported, and thus are subject to the biases inherent in such data (e.g., inaccurate reporting due to social desirability issues).

Data on maternal smoking, alcohol consumption, and drug dependence were derived from the Alberta Delivery Record. This is a different source from our previous reports; these data are thus not comparable to those appearing in previous reports. Note that rates include only women with a completed antenatal risk assessment on the Alberta Delivery Record. For 2004 to 2006 combined, 1.5% of women delivering did not have a completed risk assessment.

Table 3.4.6.1 Maternal Prenatal Drug Dependency Cases and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 179 | 277 | 355 | 436 | 506 | 578 | 661 |
| **Number of women** | 35,114 | 36,215 | 37,675 | 39,283 | 40,054 | 40,727 | 43,465 |
| **Rate (per 100 women delivering)** | 0.5 | 0.8 | 0.9 | 1.1 | 1.3 | 1.4 | 1.5 |
| **Standard Error (SE)** | 0.04 | 0.05 | 0.05 | 0.05 | 0.06 | 0.06 | 0.06 |

Table 3.4.6.2 Maternal Prenatal Drug Dependency Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Number of cases** | 337 | 684 | 369 | 212 | 118 | 22 | 1,745 |
| **Number of women** | 6,430 | 23,988 | 39,082 | 35,894 | 15,639 | 3,070 | 124,246 |
| **Rate (per 100 women delivering)** | 5.2 | 2.9 | 0.9 | 0.6 | 0.8 | 0.7 | 1.4 |
| **Standard Error (SE)** | 0.28 | 0.11 | 0.05 | 0.04 | 0.07 | 0.15 | 0.03 |

Table 3.4.6.3 Maternal Prenatal Drug Dependency Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Number of cases** | 73 | 11 | 314 | 308 | 35 | 629 | 145 | 158 | 55 | 1,745 |
| **Number of women** | 6,160 | 3,841 | 45,553 | 10,929 | 3,722 | 36,366 | 6,688 | 6,081 | 3,980 | 124,246 |
| **Rate (per 100 women delivering)** | 1.2 | 0.3 | 0.7 | 2.8 | 0.9 | 1.7 | 2.2 | 2.6 | 1.4 | 1.4 |
| **Standard Error (SE)** | 0.14 | 0.09 | 0.04 | 0.16 | 0.16 | 0.07 | 0.18 | 0.20 | 0.19 | 0.03 |

**Source:** Alberta Perinatal Health Program, September 2008 release

**Notes:** Data include Alberta residents only

Totals for age groups and RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

## 3.4.7 Maternal Prenatal HIV and HBV Screening

*Note: This section of the report was excerpted from the Alberta Blood Borne Pathogens and Sexually Transmitted Infections Surveillance Report 2008 (Alberta Blood Borne Pathogens and Sexually Transmitted Infections Surveillance Working Group, 2008).*

Human Immunodeficiency Virus (HIV) infection causes immune system suppression and leaves infected persons vulnerable to opportunistic infections and malignancies (Canadian AIDS Society and Health Canada, 2002).

Mother-to-child transmission of HIV can occur during pregnancy, delivery, or via breast-feeding. The risk of transmission is greatly reduced when antiretroviral drugs are used before and during delivery and are provided to the infant following birth. Cesarean section also has the potential to reduce mother-to-child transmission of HIV.

A prenatal screening program for HIV was established in Alberta in September 1998. All pregnant women who present for prenatal care are screened for HIV infection unless the women decline testing (i.e., it is an "opt-out" program).

Hepatitis B is caused by hepatitis B virus (HBV). Chronic HBV infection is associated with a 15-25% risk of premature death from cirrhosis and liver cancer (World Health Organization, 2004).

### Prenatal Screening for HIV (see Table 3.4.7.1)

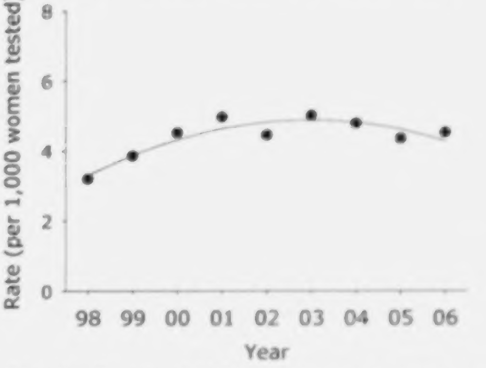
- Almost all women who received prenatal care in Alberta were screened for HIV infection between 1998 and 2006.
- The percentage of pregnant women screened increased from 92.2% to 97.0% from 1998 to 2006.
- For 1998 to 2006 combined, 0.5 pregnant women tested positive for HIV for every 1,000 live births in Alberta. There were 32 pregnant women who tested positive for HIV in 2006.
- Note that prenatal screening data include both newly diagnosed and previously diagnosed infections.

### Prenatal Screening for HBV (see Table 3.4.7.2)

- Nearly every pregnant woman receiving prenatal care in Alberta between fiscal years 1998/99 and 2006/07 was tested for HBV infection. The rate increased between 1998/99 and 2001/02, and has been at virtually 100% since 2005/06.
- Each year, approximately 5 out of every 1,000 live births occur to mothers who have tested positive for HBV during prenatal screening. In 2006/07, 252 pregnant women tested positive for HBV, for a rate of 5.6 (per 1,000 live births).

### Pregnant HBV Carriers (see Table 3.4.7.3)

**Rate of Newly Diagnosed HBV Carrier Cases in Pregnant Women, Alberta, 1998 - 2006**



- The rate of newly diagnosed HBV carrier cases among pregnant women increased from 1998 to 2001 and decreased somewhat in 2005 and 2006.
- In 2006, 228 pregnant women were found to be HBV carriers, for a rate of 4.5 (per 1,000 pregnant women).

## 3.4.7 Maternal Prenatal HIV and HBV Screening

In Canada, persons at high risk of being infected with HBV include drug users who share injecting equipment, those who snort drugs, and those who have unprotected sex with multiple partners. Almost all untreated infants who are born to HBV-positive mothers will be infected with HBV (Health Canada, 2003b).

HBV infection is preventable via a safe and effective vaccine. In Alberta, a grade 5 school based immunization program was put in place in 1995.

Since 1985, all pregnant women who access prenatal care have received HBV screening in Alberta. Infants who are born to HBV-positive mothers in Alberta are given treatment to prevent mother-to-child transmission of HBV.

### Limitations and Methodology Notes

Prenatal screening and carrier cases are analyzed by date of diagnosis.

Prenatal screening rates of positive tests are based on live births, whereas pregnant HBV carrier rates are based on pregnant women. Because there are substantially more pregnant women than live births (due to spontaneous abortions, induced abortions, and stillbirths), the rates for pregnant HBV carriers are lower than rates for prenatal HBV screening.

All rates reported in text and figures are age-adjusted (see Methodology section), with the exception of age group effects.

* HIV reporting became mandatory as of May 1998, so 1998 data may be incomplete.

### Table 3.4.7.1 Number and Percent of Pregnant Women Tested for HIV by Year, Alberta, September 1998 to August 2007

| | 1998/99 | 1999/00 | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | Sep98-Aug07 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Women eligible for testing[1]** | 47,606 | 42,522 | 41,026 | 38,988 | 39,943 | 41,635 | 43,352 | 46,551 | 50,528 | 392,151 |
| **Women tested[2]** | 43,907 | 39,729 | 39,872 | 38,011 | 38,447 | 40,246 | 41,902 | 45,059 | 48,994 | 376,167 |
| **% of eligible women tested** | 92.2 | 93.4 | 97.2 | 97.5 | 96.3 | 96.7 | 96.7 | 96.8 | 97.0 | 95.9 |
| **Women declining[3]** | 1,904 | 988 | 563 | 731 | 1,714 | 1,588 | 1,628 | 1,673 | 1,770 | 12,559 |
| **% of eligible women declining** | 4.0 | 2.3 | 1.4 | 1.9 | 4.3 | 3.8 | 3.8 | 3.6 | 3.5 | 3.2 |
| **Women tested positive[4]** | 15 | 18 | 21 | 18 | 12 | 16 | 29 | 15 | 32 | 176 |
| **Rate of positive tests (per 1,000 live births)[5]** | 0.40 | 0.48 | 0.57 | 0.48 | 0.31 | 0.40 | 0.72 | 0.36 | 0.72 | 0.50 |

**Sources:** Alberta Health and Wellness. CDRS database, August 2007 release.
Provincial Lab for Public Health - Prenatal Screening Database, as of Oct 12/07.
Canadian Blood Services. Alberta Routine Prenatal Care Blood Testing Database, Sep 1998-Aug 2002. October 2002 release.
Alberta Reproductive Health:Pregnancies & Births Table Update 2007, Alberta Health and Wellness.

**Notes:** 1. Pregnant women receiving prenatal care with a proper Requisition Form and registered with the Alberta Health Care Insurance Plan. Each woman was counted only once in a 12 month period (regardless of how many times she was tested).
2. Pregnant women who received an HIV screening test during the 12 month period. Repeated tests were excluded.
3. The estimated number of pregnant women who declined HIV testing, excluding women who were not registered with the Alberta Health Care Insurance Plan at the time of receiving prenatal care.
4. The number of pregnant women confirmed positive for HIV for the first time by Provincial Lab for Public Health and/or with a HIV case report. Cases reported in previous pregnancies were excluded.
5. The number of pregnant women confirmed positive for HIV per 1,000 live births in Alberta.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

### Table 3.4.7.2 Number and Percent of Pregnant Women Tested for HBV by Year, Alberta, September 1998 to August 2007

| | 1998/99 | 1999/00 | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | Sep98-Aug07 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Women eligible for testing[1]** | 47,606 | 42,522 | 41,026 | 38,988 | 39,943 | 41,635 | 43,352 | 46,551 | 50,528 | 392,151 |
| **Women tested[2]** | 41,037 | 40,563 | 40,408 | 38,960 | 39,886 | 41,594 | 43,324 | 46,537 | 50,508 | 382,817 |
| **% of eligible women tested** | 86.2 | 95.4 | 98.5 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 97.6 |
| **Women tested positive[3]** | **196** | **195** | **198** | **208** | **180** | **192** | **202** | **217** | **252** | **1,840** |
| **Rate of positive tests (per 1,000 live births)[4]** | 5.2 | 5.2 | 5.4 | 5.6 | 4.7 | 4.8 | 5.0 | 5.2 | 5.6 | 5.2 |

**Sources:** Provincial Lab for Public Health - Prenatal Screening Database, as of Oct 12/07.
Alberta Reproductive Health:Pregnancies & Births Table Update 2007, Alberta Health and Wellness.

**Notes:** 1. Pregnant women receiving prenatal care with a proper Requisition Form and registered with the Alberta Health Care Insurance Plan. Each woman was counted only once (regardless of how many times she was tested) in a 12 month period (from September to August).
2. Pregnant women who received an HBV screening test during the 12 month period. Repeated tests were excluded.
3. The number of pregnant women confirmed positive for HBV by Provincial Lab for Public Health and/or with an HBV case report. Cases reported in previous pregnancies were included.
4. The number of pregnant women confirmed positive for HBV per 1,000 live births in Alberta.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

### Table 3.4.7.3 Newly Diagnosed HBV Carrier Cases and Rates among Pregnant Women by Year, Alberta, 1998 to 2006

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 98-06 |
|---|---|---|---|---|---|---|---|---|---|---|
| **HBV carrier cases in pregnant women[1]** | 131 | 156 | 182 | 193 | 177 | 208 | 207 | 202 | 228 | 1,684 |
| **Pregnant women tested for HBV[2]** | 41,037 | 40,563 | 40,408 | 38,960 | 39,886 | 41,594 | 43,324 | 46,537 | 50,508 | 382,817 |
| **Rate per 1,000 pregnant women tested[3]** | 3.2 | 3.8 | 4.5 | 5.0 | 4.4 | 5.0 | 4.8 | 4.3 | 4.5 | 4.4 |
| **Standard error (SE)** | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.1 |

**Sources:** Alberta Health and Wellness. CDRS database, August 2007 release.
Provincial Lab for Public Health - Prenatal Screening Database, as of Oct 12/07.

**Notes:** 1. The number of pregnant women reported as HBV carriers, with a lab confirmation of HBsAg positive, in the CDRS database.
2. Pregnant women who received an HBV screening test during the 12 month period. Repeated tests were excluded.
3. The number of HBV carriers among pregnant women per 1,000 pregnant women tested for HBV in Alberta.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

# *4. Births*

*4.1 Fertility Rates*
*4.2 Live Births*
*4.3 Birth Weight*
*4.4 Preterm Births*
*4.5 Multiple Births*
*4.6 Infant morbidity*
*4.7 Mortality*
*4.8 Maternal factors*

# 4. Births

## 4.1 Fertility Rates

# 4.1.1 Fertility

General fertility rate: *Number of live births per 1,000 women aged 15-49 in a given year.*

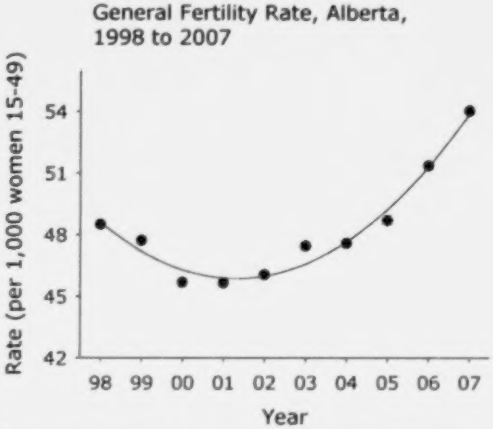
Age-specific fertility rate: *Number of live births per 1,000 women in a given age group in a given year.*

Total fertility rate: *Number of live births per 1,000 women aged 15-49 over a lifetime.* This rate is equal to the sum of the age-specific fertility rates for each year of age between 15 and 49. Total fertility rate provides an estimate of "the average number of children that would be born to each woman if all women lived to the end of their childbearing years and bore children according to the fertility patterns of the current year" (Health Canada, 2006, p. 2). For example, a total fertility rate of 1,500 would represent an average of 1.5 live births per woman. Total fertility rates differ from *completed cohort* rates, which describe the actual number of children born to women who have completed their childbearing.

A total fertility rate of 2,100 is the "replacement rate" needed to maintain the current population. The last time Canada's total fertility rate reached 2,100 was 1971 (Health Canada, 2008a).

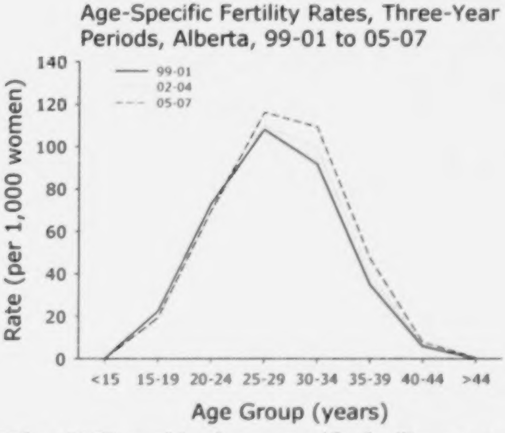
Age-specific fertility rates for women over 30 have increased since the late 1970s in Canada, reflecting a tendency to delay childbearing. For the past several decades, women 25 to 29 have had the highest fertility rates, but in 2005, the age-specific fertility rate for women 30 to 34 was the highest of all age groups for the first time among data collected since 1926 (Health Canada, 2006, 2008b).

## Time Trends (see Tables 4.1.1.1, 4.1.1.4)



- Following many years of decrease, the general fertility rate in Alberta was at a low point between 2000 and 2002 and then increased, with large increases in 2006 and 2007. In 2007, the general fertility rate was 54.0 (per 1,000 women 15-49).
- The total fertility rate followed a similar pattern.. The total fertility rate was 1,922 in 2007, or about 1.9 children per woman.

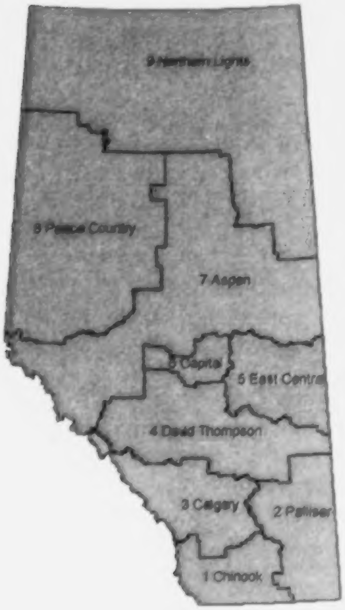
## Age Effects (see Tables 4.1.1.2, 4.1.1.4, and 4.1.1.6)



- For 2005 to 2007 combined, age-specific fertility rates were highest for women between 25 and 29 years of age (111.6 per 1,000 women), and were almost as high for women between 30 and 34 (109.3).
- The curves in the figure above show two main trends over time: fertility rates are increasing, and women are giving birth later in life. Note that fertility rates are still low relative to the middle of the 20th century.

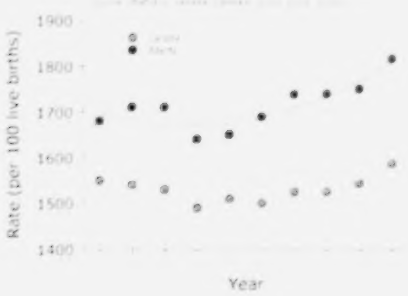
# 4.1.1 Fertility

General Fertility Rate, 2005-07
Combined



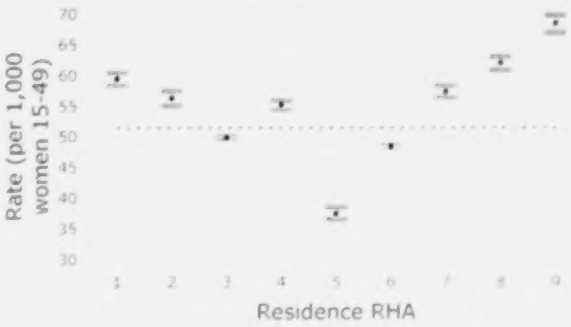
9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

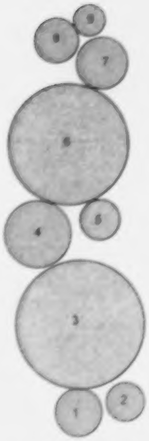
Total Fertility Rate,
Alberta and Canada, 1997 to 2006



## Regional Data (see Tables 4.1.1.3, 4.1.1.5, 4.1.1.6)

General Fertility Rate by Residence RHA,
Alberta, 2005 to 2007





- The general fertility rate was lower than the provincial average in RHAs 3, 5, and 6 between 2005 and 2007. The lowest rate was in RHA 5 (37.4 per 1,000 women 15-49).
- The general fertility rate was higher than the provincial average in the remaining RHAs. RHA 9 had the highest general fertility rate (68.3) for 2005 to 2007 combined.
- The total fertility rate for 2005 to 2007 combined was higher than replacement level (2.1) in RHAs 1, 7, 8, and 9. In 2005, only RHA 9 was at replacement.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

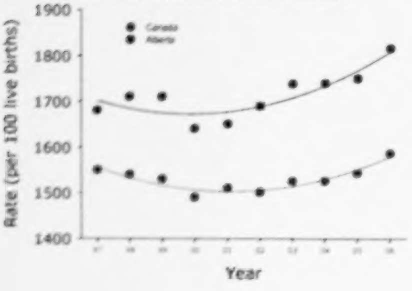
## 4.1.1 Fertility

General Fertility Rate, 2005-07
Combined

Total fertility rates declined in both Alberta and Canada through the 1990s and rose in the 2000s. In 2006, Canada's total fertility rate was 1,586 and Alberta's was 1,815, continuing the longstanding pattern of higher fertility rates in Alberta than in the nation as a whole (Statistics Canada, 2008c). In 2005, Calgary and Edmonton had the second and third highest total fertility rates of all the census metropolitan areas in Canada (Health Canada, 2008b).

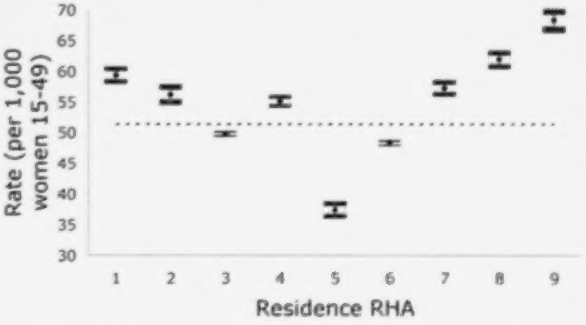
**Total Fertility Rate,**
**Alberta and Canada, 1997 to 2006**

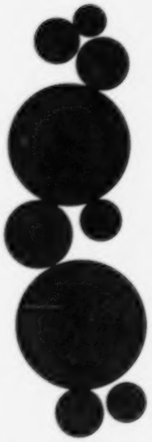
Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)



## Regional Data (see Tables 4.1.1.3, 4.1.1.5, 4.1.1.6)

General Fertility Rate by Residence RHA,
Alberta, 2005 to 2007





- The general fertility rate was lower than the provincial average in RHAs 3, 5, and 6 between 2005 and 2007. The lowest rate was in RHA 5 (37.4 per 1,00 women 15-49).
- The general fertility rate was higher than the provincial average in the remaining RHAs. RHA 9 had the highest general fertility rate (68.3) for 2005 to 2007 combined.
- The total fertility rate for 2005 to 2007 combined was higher than replacement level (2.1) in RHAs 1, 7, 8, and 9. In 2005, only RHA 9 was at replacement.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.1.1.1 Live Births, General Fertility Rate, and Total Fertility Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Women 15-49** | 774,059 | 791,981 | 802,182 | 815,913 | 831,964 | 840,560 | 847,174 | 854,349 | 869,776 | 895,127 |
| **General Fertility Rate (per 1,000 women 15-49)** | 48.5 | 47.7 | 45.7 | 45.6 | 46.0 | 47.4 | 47.6 | 48.7 | 51.3 | 54.0 |
| **Standard Error (SE)** | 0.24 | 0.24 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.24 | 0.24 |
| **Total Fertility Rate (per 1,000 women 15-49)** | 1,728 | 1,717 | 1,661 | 1,670 | 1,687 | 1,736 | 1,740 | 1,777 | 1,855 | 1,922 |

Table 4.1.1.2 Live Births and Age-Specific Fertility Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <15[1] | 15-17 | 18-19 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | >44[1] |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births** | 64 | 2,031 | 4,835 | 6,866 | 25,713 | 42,562 | 38,866 | 17,216 | 3,163 | 139 |
| **Women 15-49** | 330,472 | 210,932 | 140,397 | 351,329 | 367,550 | 366,464 | 355,677 | 362,132 | 405,501 | 410,599 |
| **Age-Specific Fertility Rate (per 1,000 women)** | 0.2 | 9.6 | 34.4 | 19.5 | 70.0 | 116.1 | 109.3 | 47.5 | 7.8 | 0.3 |
| **Standard Error (SE)** | 0.02 | 0.21 | 0.49 | 0.23 | 0.42 | 0.53 | 0.52 | 0.35 | 0.14 | 0.03 |

Table 4.1.1.3 Live Births, General Fertility Rate, and Total Fertility Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,594 |
| **Women 15-49** | 114,014 | 76,283 | 993,644 | 227,771 | 79,086 | 819,860 | 134,053 | 108,945 | 65,423 | 2,619,252 |
| **General Fertility Rate (per 1,000 women 15-49)** | 59.4 | 56.2 | 49.8 | 55.1 | 37.4 | 48.3 | 57.2 | 62.0 | 68.3 | 51.4 |
| **Standard Error (SE)** | 0.70 | 0.83 | 0.22 | 0.48 | 0.67 | 0.24 | 0.63 | 0.73 | 0.99 | 0.14 |
| **Total Fertility Rate (per 1,000 women 15-49)** | 2,141 | 2,009 | 1,756 | 2,045 | 1,468 | 1,739 | 2,158 | 2,160 | 2,306 | 1,853 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellnesse

**Notes:** 1. Age-specific fertility rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 45-49 age groups, respectively
Data include Alberta residents only
Totals for age groups and RHAs include unknown ages or RHAs
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.1.1.4 Live Births and Age-Specific Fertility Rate by Year and Maternal Age Group, and Total Fertility Rate by Year, Alberta, 1998 to 2007

| Number of live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <15[1] | 25 | 23 | 16 | 24 | 14 | 14 | 20 | 13 | 22 | 29 |
| 15-17 | 862 | 842 | 740 | 685 | 615 | 592 | 593 | 587 | 693 | 751 |
| 18-19 | 1,731 | 1,737 | 1,680 | 1,608 | 1,589 | 1,518 | 1,481 | 1,546 | 1,590 | 1,699 |
| 15-19 | 2,593 | 2,579 | 2,420 | 2,293 | 2,204 | 2,110 | 2,074 | 2,133 | 2,283 | 2,450 |
| 20-24 | 7,709 | 7,857 | 7,476 | 7,530 | 7,791 | 8,029 | 7,861 | 7,981 | 8,640 | 9,092 |
| 25-29 | 11,718 | 11,664 | 11,287 | 11,461 | 11,829 | 12,310 | 12,692 | 13,111 | 14,003 | 15,448 |
| 30-34 | 10,464 | 10,275 | 10,032 | 10,491 | 10,902 | 11,454 | 11,697 | 12,064 | 12,931 | 13,871 |
| 35-39 | 4,338 | 4,606 | 4,613 | 4,618 | 4,724 | 4,945 | 4,958 | 5,239 | 5,707 | 6,270 |
| 40-44 | 646 | 738 | 768 | 778 | 799 | 961 | 948 | 1,004 | 1,021 | 1,138 |
| >44[1] | 21 | 33 | 13 | 30 | 29 | 42 | 39 | 41 | 52 | 46 |
| All | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |

| Age Specific Fertility Rate (per 1,000 women) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <15[1] | 0.2 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 |
| 15-17 | 13.8 | 13.0 | 11.3 | 10.3 | 9.1 | 8.8 | 8.7 | 8.5 | 9.8 | 10.5 |
| 18-19 | 43.7 | 42.4 | 39.3 | 36.2 | 34.9 | 33.0 | 32.0 | 33.3 | 34.4 | 35.6 |
| 15-19 | 25.4 | 24.4 | 22.4 | 20.7 | 19.5 | 18.6 | 18.1 | 18.5 | 19.5 | 20.6 |
| 20-24 | 78.4 | 77.0 | 72.2 | 70.6 | 70.5 | 70.5 | 67.4 | 67.4 | 70.8 | 71.6 |
| 25-29 | 112.5 | 110.3 | 106.5 | 107.3 | 107.8 | 110.4 | 111.6 | 112.8 | 115.4 | 119.9 |
| 30-34 | 91.3 | 91.2 | 90.4 | 93.6 | 96.1 | 100.0 | 102.1 | 104.6 | 110.0 | 113.0 |
| 35-39 | 32.6 | 34.4 | 34.8 | 35.6 | 37.4 | 40.4 | 41.6 | 44.4 | 47.4 | 50.6 |
| 40-44 | 5.2 | 5.8 | 5.9 | 5.8 | 5.8 | 7.0 | 6.8 | 7.3 | 7.6 | 8.5 |
| >44[1] | 0.2 | 0.3 | 0.1 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 |
| Total Fertility Rate (per 1,000 women 15-49) | 1,728 | 1,717 | 1,661 | 1,670 | 1,687 | 1,736 | 1,740 | 1,777 | 1,855 | 1,922 |

Table 4.1.1.5 Live Births, General Fertility Rate, and Total Fertility Rate by Year and Residence RHA, Alberta, 1998 to 2007

| Live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 2,018 | 2,064 | 1,945 | 1,960 | 1,969 | 2,093 | 2,047 | 2,108 | 2,243 | 2,422 |
| Palliser | 1,243 | 1,232 | 1,221 | 1,230 | 1,226 | 1,258 | 1,278 | 1,349 | 1,364 | 1,576 |
| Calgary | 12,900 | 12,990 | 13,064 | 13,109 | 13,588 | 14,473 | 14,608 | 15,432 | 16,342 | 17,715 |
| David Thompson | 3,567 | 3,648 | 3,474 | 3,482 | 3,616 | 3,727 | 3,786 | 3,824 | 4,253 | 4,479 |
| East Central | 996 | 961 | 908 | 882 | 971 | 898 | 954 | 925 | 992 | 1,042 |
| Capital | 11,189 | 11,320 | 10,790 | 11,054 | 11,293 | 11,702 | 11,915 | 12,106 | 13,131 | 14,398 |
| Aspen | 2,594 | 2,540 | 2,285 | 2,404 | 2,408 | 2,386 | 2,396 | 2,386 | 2,583 | 2,705 |
| Peace Country | 1,918 | 1,947 | 1,816 | 1,907 | 1,921 | 2,037 | 1,959 | 2,075 | 2,298 | 2,377 |
| Northern Lights | 1,101 | 1,070 | 1,116 | 1,192 | 1,299 | 1,292 | 1,348 | 1,384 | 1,453 | 1,634 |
| Alberta | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |

| General Fertility Rate (per 1,000 women 15-49) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 55.0 | 55.6 | 52.0 | 52.3 | 52.6 | 55.8 | 54.4 | 56.0 | 59.3 | 62.8 |
| Palliser | 53.8 | 52.1 | 50.9 | 50.2 | 49.3 | 50.7 | 51.1 | 53.6 | 53.9 | 61.0 |
| Calgary | 46.0 | 44.9 | 44.3 | 43.4 | 43.9 | 46.0 | 45.9 | 47.8 | 49.4 | 52.1 |
| David Thompson | 52.3 | 52.3 | 49.1 | 48.5 | 49.5 | 50.7 | 51.1 | 51.3 | 56.3 | 57.7 |
| East Central | 38.8 | 37.4 | 35.1 | 33.8 | 36.9 | 34.1 | 36.4 | 35.3 | 38.0 | 38.9 |
| Capital | 45.5 | 45.1 | 42.6 | 43.0 | 43.2 | 44.3 | 44.8 | 45.3 | 48.3 | 51.3 |
| Aspen | 59.0 | 57.2 | 51.5 | 53.7 | 53.4 | 53.3 | 53.8 | 53.9 | 58.0 | 59.8 |
| Peace Country | 58.2 | 57.8 | 53.7 | 55.9 | 55.5 | 58.7 | 55.9 | 58.7 | 63.4 | 63.7 |
| Northern Lights | 64.5 | 61.4 | 62.8 | 65.1 | 67.4 | 64.5 | 65.4 | 65.7 | 67.4 | 71.7 |
| Alberta | 48.5 | 47.7 | 45.7 | 45.6 | 46.0 | 47.4 | 47.6 | 48.7 | 51.3 | 54.0 |

| Total Fertility Rate (per 1,000 women 15-49) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 2,013.7 | 2,055.7 | 1,937.1 | 1,947.4 | 1,954.4 | 2,051.8 | 1,990.4 | 2,049.1 | 2,148.6 | 2,222.0 |
| Palliser | 1,975.2 | 1,924.5 | 1,899.5 | 1,875.8 | 1,833.2 | 1,888.2 | 1,879.0 | 1,951.5 | 1,925.1 | 2,142.6 |
| Calgary | 1,598.6 | 1,571.2 | 1,568.7 | 1,544.2 | 1,563.9 | 1,639.2 | 1,636.6 | 1,703.3 | 1,746.5 | 1,815.2 |
| David Thompson | 1,934.3 | 1,958.4 | 1,866.3 | 1,847.6 | 1,892.6 | 1,937.8 | 1,940.8 | 1,942.3 | 2,086.9 | 2,101.9 |
| East Central | 1,478.7 | 1,461.0 | 1,399.9 | 1,355.0 | 1,482.8 | 1,369.4 | 1,454.3 | 1,413.0 | 1,490.6 | 1,498.9 |
| Capital | 1,620.5 | 1,621.0 | 1,548.8 | 1,573.6 | 1,580.2 | 1,616.0 | 1,638.1 | 1,648.0 | 1,741.0 | 1,823.0 |
| Aspen | 2,113.1 | 2,092.0 | 1,910.7 | 2,026.2 | 2,034.3 | 2,033.4 | 2,050.7 | 2,055.1 | 2,192.8 | 2,222.0 |
| Peace Country | 2,026.8 | 2,042.5 | 1,914.0 | 2,003.3 | 1,996.6 | 2,102.3 | 2,002.5 | 2,081.9 | 2,207.9 | 2,187.3 |
| Northern Lights | 2,172.5 | 2,091.5 | 2,156.9 | 2,247.5 | 2,329.4 | 2,222.2 | 2,248.6 | 2,242.4 | 2,286.3 | 2,384.6 |
| Alberta | 1,728.3 | 1,716.9 | 1,661.1 | 1,669.5 | 1,686.7 | 1,736.0 | 1,739.9 | 1,776.7 | 1,855.3 | 1,922.3 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release

Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellnesse

**Notes:** 1. Age-specific fertility rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 45-49 age groups, respectively

Data include Alberta residents only

Totals for age groups and RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

## Table 4.1.1.6 Age-Specific Fertility Rate by Residence RHA and Maternal Age Group and Total Fertility Rate by Residence RHA, Alberta, 2005 to 2007

| 2005 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| <15[1] | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.1 | 0.1 | 0.8 | 0.3 | 0.1 |
| 15-17 | 12.2 | 6.9 | 5.3 | 14.2 | 2.4 | 7.2 | 13.7 | 18.7 | 17.6 | 8.5 |
| 18-19 | 35.6 | 41.4 | 20.5 | 45.4 | 21.9 | 29.8 | 62.3 | 61.4 | 73.5 | 33.3 |
| 15-19 | 21.8 | 20.7 | 11.3 | 26.9 | 10.0 | 16.4 | 32.9 | 36.3 | 40.4 | 18.5 |
| 20-24 | 95.5 | 95.8 | 50.4 | 89.8 | 58.0 | 57.9 | 105.3 | 105.0 | 120.9 | 67.4 |
| 25-29 | 136.8 | 139.5 | 99.6 | 145.5 | 113.9 | 104.4 | 143.5 | 137.7 | 145.6 | 112.8 |
| 30-34 | 106.8 | 95.1 | 115.2 | 88.6 | 72.4 | 101.7 | 89.1 | 101.2 | 98.1 | 104.6 |
| 35-39 | 41.5 | 32.9 | 54.6 | 33.7 | 25.4 | 41.6 | 33.1 | 32.1 | 38.6 | 44.4 |
| 40-44 | 7.3 | 6.4 | 9.1 | 3.9 | 2.7 | 7.3 | 7.0 | 3.7 | 5.0 | 7.3 |
| >44[1] | 0.2 | 0.0 | 0.5 | 0.1 | 0.2 | 0.3 | 0.2 | 0.4 | 0.0 | 0.3 |
| Total Fertility Rate | 2,049 | 1,952 | 1,703 | 1,942 | 1,413 | 1,648 | 2,055 | 2,082 | 2,242 | 1,777 |

| 2006 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| <15[1] | 0.2 | 0.3 | 0.1 | 0.4 | 0.0 | 0.2 | 0.9 | 0.2 | 0.0 | 0.2 |
| 15-17 | 9.5 | 8.3 | 5.8 | 15.0 | 7.9 | 9.3 | 17.4 | 17.6 | 23.9 | 9.8 |
| 18-19 | 39.2 | 41.4 | 20.9 | 51.1 | 27.2 | 29.3 | 67.8 | 67.9 | 62.8 | 34.4 |
| 15-19 | 21.3 | 21.6 | 11.7 | 29.8 | 15.3 | 17.3 | 36.8 | 37.5 | 39.4 | 19.5 |
| 20-24 | 98.4 | 97.2 | 52.4 | 101.2 | 55.6 | 59.6 | 110.5 | 117.4 | 120.9 | 70.8 |
| 25-29 | 151.2 | 142.3 | 100.8 | 145.4 | 113.2 | 107.1 | 150.0 | 149.0 | 137.6 | 115.4 |
| 30-34 | 114.0 | 90.4 | 118.0 | 103.6 | 76.8 | 108.2 | 101.9 | 100.3 | 105.5 | 110.0 |
| 35-39 | 38.7 | 29.1 | 56.7 | 31.3 | 34.2 | 48.1 | 33.5 | 33.1 | 43.9 | 47.4 |
| 40-44 | 5.9 | 4.2 | 9.3 | 5.4 | 3.0 | 7.6 | 5.4 | 4.3 | 9.5 | 7.6 |
| >44[1] | 0.3 | 0.3 | 0.4 | 0.7 | 0.0 | 0.4 | 0.4 | 0.0 | 0.3 | 0.4 |
| Total Fertility Rate | 2,149 | 1,925 | 1,747 | 2,087 | 1,491 | 1,741 | 2,193 | 2,208 | 2,286 | 1,855 |

| 2007 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| <15[1] | 0.5 | 0.9 | 0.1 | 0.2 | 0.5 | 0.2 | 0.4 | 0.2 | 1.0 | 0.3 |
| 15-17 | 16.9 | 12.6 | 6.7 | 11.8 | 4.2 | 9.2 | 23.5 | 18.4 | 23.0 | 10.5 |
| 18-19 | 50.8 | 46.7 | 22.0 | 52.2 | 25.2 | 29.3 | 63.7 | 70.8 | 75.0 | 35.6 |
| 15-19 | 30.6 | 26.5 | 12.8 | 28.2 | 12.3 | 17.3 | 39.0 | 39.0 | 44.4 | 20.6 |
| 20-24 | 103.5 | 106.7 | 53.6 | 97.0 | 69.5 | 59.9 | 108.4 | 113.0 | 122.3 | 71.6 |
| 25-29 | 146.3 | 155.3 | 103.6 | 148.1 | 115.4 | 114.6 | 154.5 | 147.9 | 150.1 | 119.9 |
| 30-34 | 115.0 | 99.1 | 121.6 | 104.7 | 74.4 | 112.9 | 99.3 | 95.8 | 107.1 | 113.0 |
| 35-39 | 39.0 | 36.0 | 60.5 | 36.7 | 22.7 | 51.2 | 38.0 | 34.9 | 44.1 | 50.6 |
| 40-44 | 9.2 | 4.6 | 10.5 | 5.5 | 5.2 | 8.3 | 5.0 | 6.9 | 8.9 | 8.5 |
| >44[1] | 0.8 | 0.5 | 0.4 | 0.2 | 0.2 | 0.3 | 0.1 | 0.0 | 0.0 | 0.3 |
| Total Fertility Rate | 2,222 | 2,143 | 1,815 | 2,102 | 1,499 | 1,823 | 2,222 | 2,187 | 2,385 | 1,922 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness

**Notes:** 1. Age-specific fertility rates for age groups <15 and >44 are calculated based on female populations in the 10-14 and 45-49 age groups, respectively
Data include Alberta residents only
Totals for age groups and RHAs include unknown ages or RHAs
Data may differ from previously published data due to differences in definitions and dates of data extraction

# 4. Births

## 4.2 Live Births

# 4.2.1 Live Births

Live birth: *"The complete expulsion or extraction from the mother, irrespective of the duration of the pregnancy, of a fetus in which, after expulsion or extraction, there is breathing, beating of the heart, pulsation of the umbilical cord or unmistakable movement of voluntary muscle, whether or not the umbilical cord has been cut or the placenta is attached."* (Alberta Vital Statistics Act, RSA 1980 cV-4 s1)

Total births: *The sum of live births and stillbirths in a given year.*

Crude birth rate: *Number of live births per 1,000 population in a given year.*

Life expectancy: *The expected number of years of life remaining at a given age if current mortality rates continue to apply.*

Home birth: *"A birth for which the location is listed on the Registration of Birth as "home""* rather than hospital, en route, or some other location. This variable does not distinguish between planned and unplanned home births. Only live births are included.

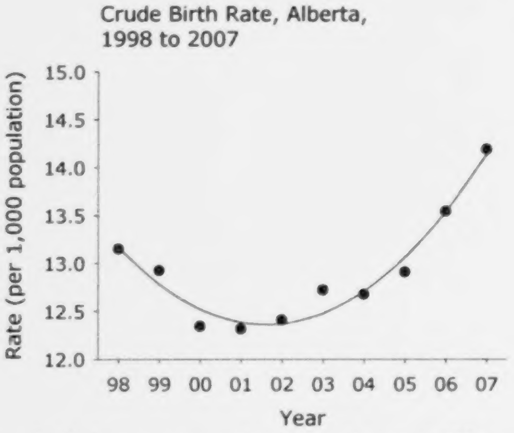
Home birth rate: *Number of live home births per 100 live births.*

Midwife attended birth: *"A birth at which the primary attendant at birth is listed on the Registration of Birth as "midwife."*" Only live births are included.

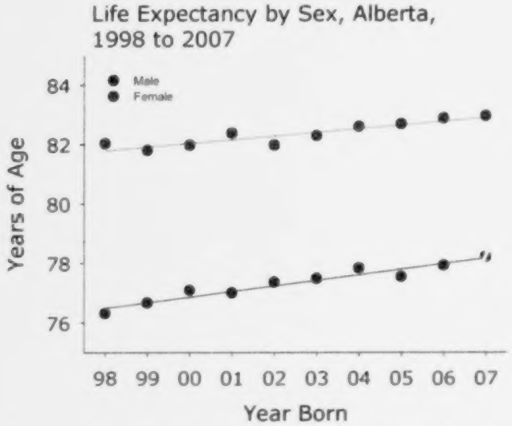
Midwife attended birth rate: *Number of live births with midwife as attendant, per 100 live births.*

## Time Trends (see Tables 4.2.1.1, 4.2.1.3, 4.2.1.4, 4.2.1.7, 4.2.1.10)

- There were 48,348 live births in Alberta in 2007, the largest number in Alberta's history. Contributing to this increase are increasing fertility rates (see previous section) and a high rate of migration into the province by people of reproductive age.



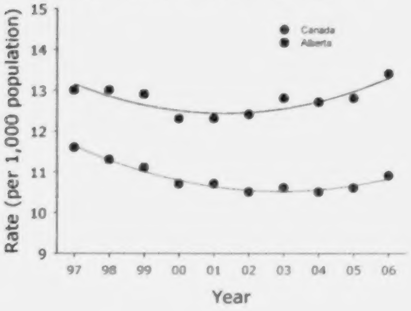
- The crude birth rate was at a low point between 2000 and 2002 after declining throughout the 1990s. Increases in 2006 and 2007 were particularly large. In 2007, the crude birth rate was 14.2 (per 1,000 population).



- The life expectancy of a female infant born in Alberta in 2007 was 83.0 years on average. Males born in 2007 could expect to live 78.2 years on average. Life expectancy continues to climb for both males and females, although the rate increased more rapidly for males than for females between 1998 and 2007.

# 4.2.1 Live Births

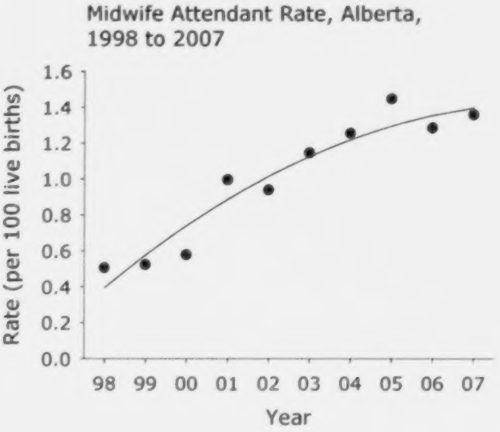
Crude birth rates in Canada declined through the last half of the 1990s, and were fairly stable to 2005 before increasing in 2006. In Alberta, declines in the 1990s were followed by an increasing trend, with notable increases in 2003 and 2006, widening the gap in crude birth rates between Canada and Alberta. In 2006, the Canadian crude birth rate was 10.9, and the Albertan rate was 13.4 (Statistics Canada, 2008c).


Crude Birth Rate, Alberta and Canada, 1997 to 2006

Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)

## Time Trends continued (see Tables 4.2.1.1, 4.2.1.3, 4.2.1.4, 4.2.1.7, 4.2.1.10)

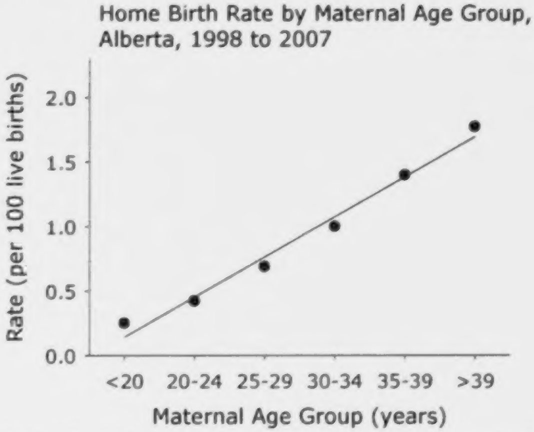
- In 2007, there were 379 live home births in Alberta (0.8% of live births). This rate did not vary significantly over time between 1998 and 2007.


Midwife Attendant Rate, Alberta, 1998 to 2007

- From 1998 to 2005, the midwife attendant rate increased; it decreased slightly in 2006 and remained about the same in 2007. In 2007, 1.4% of live births in Alberta (656 live births) were attended by midwives.
- Midwives attend births in hospitals, birth centres, and private homes. Hospital admitting privileges were extended to midwives in some RHAs in 1999. Prior to 2001, the percentage of midwife-attended live births that occurred in hospitals was less than 10%. In 2007, 54.4% of midwife-attended live births occurred in hospitals.
- From 2001 to 2007, mean birth weight decreased by 42 grams. Mean birth weight for live births in Alberta was 3,347 grams in 2007.

# 4.2.1 Live Births

## Age Effects (see Tables 4.2.1.5, 4.2.1.8)

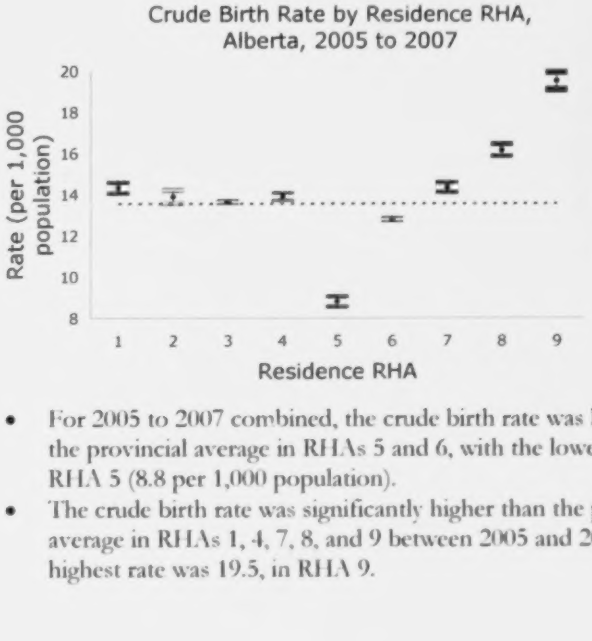


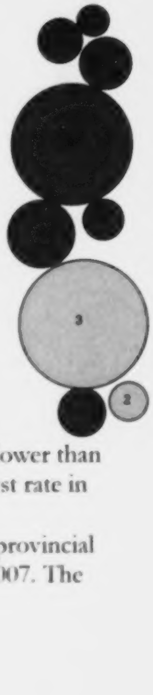
- Older mothers are much more likely than younger mothers to give birth at home. For 1998 to 2007 combined, mothers 40 years old and older had a home birth rate of 1.8 (per 100 live births), compared with 0.2 for teen mothers.
- Older mothers are also more likely to use the services of midwives, with a midwife attendant rate of 1.8 (per 100 live births) for women over 39 and a rate of 0.2 for women under 20 between 1998 and 2007.

Crude Birth Rate, 2005-07 Combined

3 Calgary
2 Palliser

## Regional Data (see Tables 4.2.1.2, 4.2.1.6, 4.2.1.9)

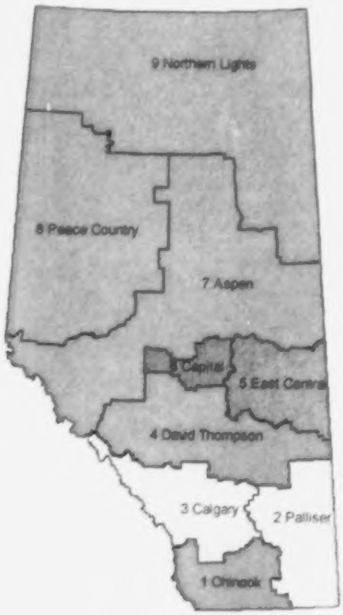




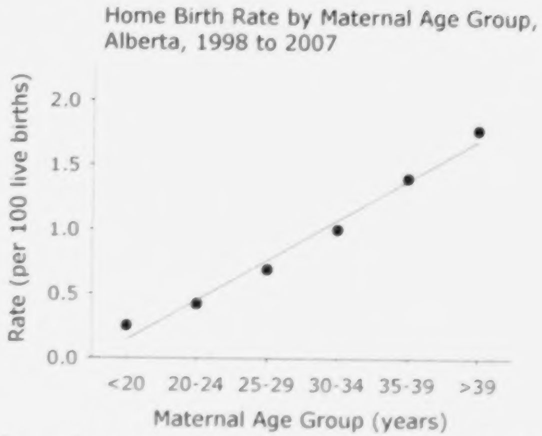
- For 2005 to 2007 combined, the crude birth rate was lower than the provincial average in RHAs 5 and 6, with the lowest rate in RHA 5 (8.8 per 1,000 population).
- The crude birth rate was significantly higher than the provincial average in RHAs 1, 4, 7, 8, and 9 between 2005 and 2007. The highest rate was 19.5, in RHA 9.

# 4.2.1 Live Births

Crude Birth Rate, 2005-07 Combined

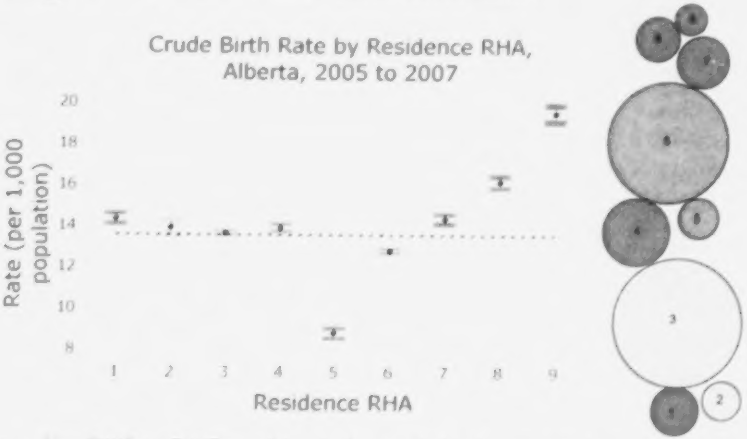

9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Age Effects (see Tables 4.2.1.5, 4.2.1.8)



- Older mothers are much more likely than younger mothers to give birth at home. For 1998 to 2007 combined, mothers 40 years old and older had a home birth rate of 1.8 (per 100 live births), compared with 0.2 for teen mothers.
- Older mothers are also more likely to use the services of midwives, with a midwife attendant rate of 1.8 (per 100 live births) for women over 39 and a rate of 0.2 for women under 20 between 1998 and 2007.

## Regional Data (see Tables 4.2.1.2, 4.2.1.6, 4.2.1.9)



- For 2005 to 2007 combined, the crude birth rate was lower than the provincial average in RHAs 5 and 6, with the lowest rate in RHA 5 (8.8 per 1,000 population).
- The crude birth rate was significantly higher than the provincial average in RHAs 1, 4, 7, 8, and 9 between 2005 and 2007. The highest rate was 19.5, in RHA 9.

# 4.2.1 Live Births

In a review of planned home births with "first level" care (a facilitating environment at the place of birth, skilled birth attendance, and a continuum of perinatal care for women and infants), Fullerton, Navarro, and Young (2007) found consistently favourable maternal and newborn outcomes, in comparison to reference groups such as planned hospital births and vital statistics databases.

As of September 1 2007, there were 31 Registered Midwives and 6 Student Midwives in Alberta. The Alberta Government has announced that, as of April 1, 2009, midwifery services will be fully funded. This means that the province will pay for midwifery services for women with low-risk pregnancies who choose to deliver with the assistance of midwives, in their homes, in community birthing centres, or in hospitals. This funding change is expected to "provide better access and more choice for expectant women and will relieve pressure on doctors, nurses and hospitals" (Alberta Health and Wellness, 2008).

In Canada in 2006, mean birth weight was 3,370 grams; the mean for Alberta was 3,345 grams (Statistics Canada, 2008c). Male babies weighed a little more than 100 grams more than female babies on average.

## Regional Data continued (see Tables 4.2.1.2, 4.2.1.6, 4.2.1.9)

- For 1998 to 2007, the home birth rate was significantly lower than the provincial average in RHAs 1, 2, 7, 8, and 9, with the lowest rate (0.2% of live births) in RHA 9. The rate of home births was higher than the provincial average in RHA 3 during that time period (1.1% of live births).
- The midwife-attendant rate was higher than the provincial average in the metropolitan centres (RHAs 3 and 6), and lower than the provincial average in all other RHAs for 1998 to 2007 combined. This pattern reflects availability of midwifery services.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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## Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.2.1.1 Live Births and Crude Birth Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Total population** | 2,854,621 | 2,923,449 | 2,967,755 | 3,022,891 | 3,086,646 | 3,134,337 | 3,179,036 | 3,222,191 | 3,298,028 | 3,407,742 |
| **Crude Birth Rate (per 1,000 population)** | 13.1 | 12.9 | 12.3 | 12.3 | 12.4 | 12.7 | 12.7 | 12.9 | 13.5 | 14.2 |
| **Standard Error (SE)** | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |

Table 4.2.1.2 Live Births and Crude Birth Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,594 |
| **Total population** | 472,544 | 308,608 | 3,627,640 | 903,360 | 335,784 | 3,097,553 | 534,728 | 417,801 | 229,081 | 9,927,961 |
| **Crude Birth Rate (per 1,000 population)** | 14.3 | 13.9 | 13.6 | 13.9 | 8.8 | 12.8 | 14.4 | 16.2 | 19.5 | 13.6 |
| **Standard Error (SE)** | 0.17 | 0.21 | 0.06 | 0.12 | 0.16 | 0.06 | 0.16 | 0.20 | 0.29 | 0.04 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release

Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness, May 2008 release

**Notes:** Data include Alberta residents only

Totals for age groups and RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.2.1.3 Life Expectancy by Year and Sex, Alberta, 1998 to 2007

| **Females** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Life Expectancy** | 82.0 | 81.8 | 82.0 | 82.4 | 82.0 | 82.3 | 82.6 | 82.7 | 82.9 | 83.0 |
| **Standard Error (SE)** | 0.13 | 0.13 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |

| **Males** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Life Expectancy** | 76.3 | 76.7 | 77.1 | 77.0 | 77.4 | 77.5 | 77.8 | 77.5 | 77.9 | 78.2 |
| **Standard Error (SE)** | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |

**Source:** Vital Statistics, Death File, Service Alberta, extracted January 2008

Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness, extracted January 2008

**Notes:** Data include Alberta residents only

Totals for RHAs include unknown RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.2.1.4 Home Births and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Home births** | 283 | 304 | 302 | 349 | 332 | 341 | 274 | 315 | 378 | 379 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.7 | 0.8 | 0.8 | 0.8 |
| **Standard Error (SE)** | 0.04 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 |

Table 4.2.1.5 Home Births and Rate by Maternal Age Group, Alberta, 1998 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Home births** | 58 | 335 | 862 | 1,140 | 699 | 162 | 3,256 |
| **Live births** | 23,339 | 79,966 | 125,523 | 114,181 | 50,018 | 9,147 | 402,174 |
| **Rate (per 100 live births)** | 0.2 | 0.4 | 0.7 | 1.0 | 1.4 | 1.8 | 0.8 |
| **Standard Error (SE)** | 0.03 | 0.02 | 0.02 | 0.03 | 0.05 | 0.14 | 0.01 |

Table 4.2.1.6 Home Births and Rate by Residence RHA, Alberta, 1998 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Home births** | 84 | 38 | 1,563 | 318 | 62 | 977 | 105 | 80 | 30 | 3,257 |
| **Live births** | 20,867 | 12,977 | 144,219 | 37,856 | 9,529 | 118,898 | 24,687 | 20,257 | 12,889 | 402,179 |
| **Rate (per 100 live births)** | 0.4 | 0.3 | 1.1 | 0.8 | 0.7 | 0.8 | 0.4 | 0.4 | 0.2 | 0.8 |
| **Standard Error (SE)** | 0.04 | 0.05 | 0.03 | 0.05 | 0.08 | 0.03 | 0.04 | 0.04 | 0.04 | 0.01 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.2.1.7 Midwife-attended Births and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Midwife-attended live births** | 189 | 197 | 211 | 370 | 359 | 456 | 505 | 601 | 573 | 656 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Midwife attendant rate (per 100 live birth** | 0.5 | 0.5 | 0.6 | 1.0 | 0.9 | 1.1 | 1.3 | 1.4 | 1.3 | 1.4 |
| **Standard Error (SE)** | 0.04 | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 | 0.06 | 0.06 | 0.05 | 0.05 |
| **Midwife-attended live hospital births** | 12 | 5 | 18 | 91 | 92 | 186 | 279 | 344 | 290 | 357 |
| **% of midwive-attended live births occurring in hospital** | 6.3 | 2.5 | 8.5 | 24.6 | 25.6 | 40.8 | 55.2 | 57.2 | 50.6 | 54.4 |

Table 4.2.1.8 Midwife-attended Births and Rate by Maternal Age Group, Alberta, 1998 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Midwife-attended live births** | 53 | 420 | 1,212 | 1,497 | 767 | 168 | 4,117 |
| **Live births** | 23,339 | 79,966 | 125,523 | 114,181 | 50,018 | 9,147 | 402,193 |
| **Rate (per 100 live births)** | 0.2 | 0.5 | 1.0 | 1.3 | 1.5 | 1.8 | 1.0 |
| **Standard Error (SE)** | 0.03 | 0.03 | 0.03 | 0.03 | 0.05 | 0.14 | 0.02 |

Table 4.2.1.9 Midwife-attended Births and Rate by Residence RHA, Alberta, 1998 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Midwife-attended live births** | 19 | 10 | 1,799 | 339 | 56 | 1,709 | 128 | 37 | 20 | 4,117 |
| **Live births** | 20,867 | 12,977 | 144,219 | 37,856 | 9,529 | 118,898 | 24,687 | 20,257 | 12,889 | 402,207 |
| **Rate (per 100 live births)** | 0.1 | 0.1 | 1.2 | 0.9 | 0.6 | 1.4 | 0.5 | 0.2 | 0.2 | 1.0 |
| **Standard Error (SE)** | 0.02 | 0.02 | 0.03 | 0.05 | 0.08 | 0.03 | 0.05 | 0.03 | 0.03 | 0.02 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release

**Notes:** Data include Alberta residents only

Totals for age groups and RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.2.1.10 Mean Birth Weight for Selected Categories of Live Births, Alberta, 1998 to 2007

| **Mean birth weight (in grams)** | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| All Live Births | 3,377 | 3,388 | 3,386 | 3,389 | 3,380 | 3,374 | 3,362 | 3,352 | 3,344 | 3,347 |
| Preterm Births | 2,328 | 2,333 | 2,360 | 2,365 | 2,339 | 2,349 | 2,359 | 2,323 | 2,306 | 2,289 |
| Term Births | 3,462 | 3,477 | 3,481 | 3,483 | 3,478 | 3,473 | 3,463 | 3,454 | 3,445 | 3,444 |
| Singleton Births | 3,405 | 3,415 | 3,417 | 3,421 | 3,414 | 3,409 | 3,398 | 3,384 | 3,376 | 3,380 |
| Multiple Births | 2,363 | 2,401 | 2,363 | 2,387 | 2,331 | 2,342 | 2,343 | 2,372 | 2,377 | 2,383 |

Source: Vital Statistics, Birth File, Service Alberta, May 2008 release

Notes: Data include Alberta residents only

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.2.1.11 Live Births by Year and Maternal Age Group, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **<15** | 25 | 23 | 16 | 24 | 14 | 14 | 20 | 13 | 22 | 29 |
| **15-17** | 862 | 842 | 740 | 685 | 615 | 592 | 593 | 587 | 693 | 751 |
| **18-19** | 1,731 | 1,737 | 1,680 | 1,608 | 1,589 | 1,518 | 1,481 | 1,546 | 1,590 | 1,699 |
| **15-19** | 2,593 | 2,579 | 2,420 | 2,293 | 2,204 | 2,110 | 2,074 | 2,133 | 2,283 | 2,450 |
| **20-24** | 7,709 | 7,857 | 7,476 | 7,530 | 7,791 | 8,029 | 7,861 | 7,981 | 8,640 | 9,092 |
| **25-29** | 11,718 | 11,664 | 11,287 | 11,461 | 11,829 | 12,310 | 12,692 | 13,111 | 14,003 | 15,448 |
| **30-34** | 10,464 | 10,275 | 10,032 | 10,491 | 10,902 | 11,454 | 11,697 | 12,064 | 12,931 | 13,871 |
| **35-39** | 4,338 | 4,606 | 4,613 | 4,618 | 4,724 | 4,945 | 4,958 | 5,239 | 5,707 | 6,270 |
| **40-44** | 646 | 738 | 768 | 778 | 799 | 961 | 948 | 1,004 | 1,021 | 1,138 |
| **>44** | 21 | 33 | 13 | 30 | 29 | 42 | 39 | 41 | 52 | 46 |
| **All** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |

Table 4.2.1.12 Live Births by Year and Residence RHA, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Chinook** | 2,018 | 2,064 | 1,945 | 1,960 | 1,969 | 2,093 | 2,047 | 2,106 | 2,243 | 2,422 |
| **Palliser** | 1,243 | 1,232 | 1,221 | 1,230 | 1,226 | 1,258 | 1,278 | 1,349 | 1,364 | 1,576 |
| **Calgary** | 12,900 | 12,990 | 13,064 | 13,109 | 13,588 | 14,473 | 14,606 | 15,432 | 16,342 | 17,715 |
| **David Thompson** | 3,567 | 3,648 | 3,474 | 3,482 | 3,616 | 3,727 | 3,786 | 3,824 | 4,253 | 4,479 |
| **East Central** | 996 | 961 | 906 | 882 | 971 | 896 | 954 | 925 | 992 | 1,042 |
| **Capital** | 11,189 | 11,320 | 10,790 | 11,054 | 11,293 | 11,702 | 11,915 | 12,106 | 13,131 | 14,398 |
| **Aspen** | 2,594 | 2,540 | 2,285 | 2,404 | 2,408 | 2,386 | 2,396 | 2,386 | 2,583 | 2,705 |
| **Peace Country** | 1,918 | 1,947 | 1,818 | 1,907 | 1,921 | 2,037 | 1,959 | 2,075 | 2,298 | 2,377 |
| **Northern Lights** | 1,101 | 1,070 | 1,116 | 1,192 | 1,299 | 1,292 | 1,348 | 1,384 | 1,453 | 1,634 |
| **Alberta** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.
Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness, May 2008 release.

**Notes:** Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.2.1.13 Live Births by Residence RHA and Maternal Age Group, Alberta, 2005 to 2007

| 2005 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 0 | 0 | 0 | 2 | 0 | 5 | 1 | 4 | 1 | 13 |
| 15-17 | 43 | 15 | 126 | 97 | 6 | 150 | 60 | 58 | 32 | 587 |
| 18-19 | 87 | 60 | 319 | 214 | 35 | 428 | 178 | 133 | 92 | 1,546 |
| 15-19 | 130 | 75 | 445 | 311 | 41 | 578 | 238 | 191 | 124 | 2,133 |
| 20-24 | 570 | 354 | 2,109 | 968 | 206 | 2,205 | 637 | 558 | 374 | 7,981 |
| 25-29 | 686 | 480 | 4,463 | 1,352 | 345 | 3,892 | 752 | 669 | 472 | 13,111 |
| 30-34 | 483 | 308 | 5,376 | 812 | 228 | 3,586 | 502 | 479 | 290 | 12,064 |
| 35-39 | 195 | 107 | 2,537 | 330 | 92 | 1,515 | 203 | 152 | 108 | 5,239 |
| 40-44 | 41 | 25 | 479 | 48 | 12 | 312 | 52 | 20 | 15 | 1,004 |
| >44 | 1 | 0 | 23 | 1 | 1 | 12 | 1 | 2 | 0 | 41 |
| All | 2,106 | 1,349 | 15,432 | 3,824 | 925 | 12,106 | 2,386 | 2,075 | 1,384 | 41,587 |

| 2006 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 1 | 1 | 2 | 4 | 0 | 7 | 6 | 1 | 0 | 22 |
| 15-17 | 34 | 18 | 144 | 102 | 20 | 198 | 77 | 56 | 44 | 693 |
| 18-19 | 93 | 60 | 331 | 239 | 43 | 418 | 187 | 142 | 77 | 1,590 |
| 15-19 | 127 | 78 | 475 | 341 | 63 | 616 | 264 | 198 | 121 | 2,283 |
| 20-24 | 593 | 366 | 2,251 | 1,143 | 198 | 2,340 | 694 | 662 | 393 | 8,640 |
| 25-29 | 790 | 513 | 4,730 | 1,419 | 356 | 4,148 | 815 | 764 | 468 | 14,003 |
| 30-34 | 516 | 291 | 5,644 | 965 | 242 | 3,907 | 560 | 492 | 314 | 12,931 |
| 35-39 | 182 | 98 | 2,735 | 309 | 120 | 1,775 | 202 | 158 | 128 | 5,707 |
| 40-44 | 32 | 16 | 485 | 63 | 13 | 322 | 39 | 23 | 28 | 1,021 |
| >44 | 2 | 1 | 20 | 9 | 0 | 16 | 3 | 0 | 1 | 52 |
| All | 2,243 | 1,364 | 16,342 | 4,253 | 992 | 13,131 | 2,583 | 2,298 | 1,453 | 44,659 |

| 2007 | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| <15 | 3 | 3 | 4 | 2 | 2 | 8 | 3 | 1 | 3 | 29 |
| 15-17 | 60 | 27 | 166 | 81 | 11 | 199 | 105 | 59 | 43 | 751 |
| 18-19 | 123 | 69 | 363 | 244 | 41 | 434 | 179 | 148 | 98 | 1,699 |
| 15-19 | 183 | 96 | 529 | 325 | 52 | 633 | 284 | 207 | 141 | 2,450 |
| 20-24 | 645 | 416 | 2,394 | 1,140 | 260 | 2,455 | 697 | 661 | 424 | 9,092 |
| 25-29 | 806 | 587 | 5,144 | 1,561 | 376 | 4,712 | 894 | 808 | 560 | 15,448 |
| 30-34 | 545 | 332 | 6,047 | 1,015 | 249 | 4,286 | 560 | 492 | 345 | 13,871 |
| 35-39 | 186 | 123 | 3,031 | 371 | 80 | 1,944 | 229 | 172 | 134 | 6,270 |
| 40-44 | 49 | 17 | 541 | 63 | 22 | 347 | 36 | 36 | 27 | 1,138 |
| >44 | 5 | 2 | 22 | 2 | 1 | 13 | 1 | 0 | 0 | 46 |
| All | 2,422 | 1,576 | 17,715 | 4,479 | 1,042 | 14,398 | 2,705 | 2,377 | 1,634 | 48,348 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

# 4. *Births*

## *4.3 Birth Weight*

*4.3.1 Small-for-gestational-age*
*4.3.2 Low birth weight*
*4.3.3 Large-for-gestational-age*
*4.3.4 High birth weight*

## 4.3.1 Small-for Gestational-Age

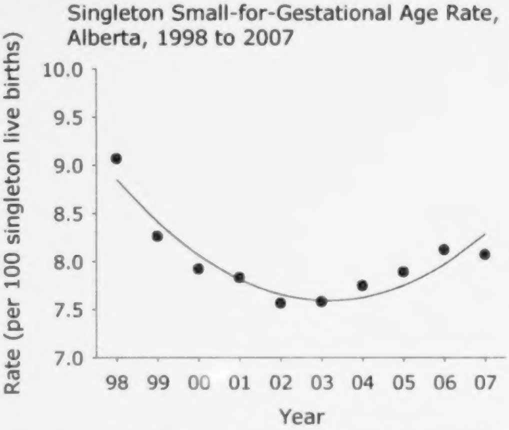
Small-for-gestational-age infants *have a birth weight below the 10th percentile of appropriate-for-gestational-age infants* (see Alberta norms in Robertson, Svenson, & Kyle, 2002). Some infants are simply genetically small; others are affected by intrauterine growth restriction.

Singleton small-for-gestational-age rate: *Number of singleton small-for-gestational-age live births per 100 singleton live births.* Rates may also be calculated for multiple births.

In a study of 76,444 Alberta births, researchers found that small-for-gestational-age births were associated with a number of modifiable risk factors, including maternal prenatal smoking, multiple gestation (which may be modifiable in pregnancies involving assisted reproduction), low pre-pregnancy weight, inadequate prenatal weight gain, and older maternal age (35 years or older) (Newburn-Cook et al., 2002). Multiple gestations and older maternal age are both increasing in frequency.

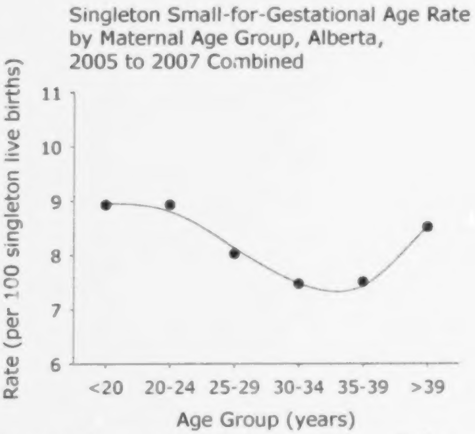
Millar and Chen (1998) found that small-for-gestational-age births were more prevalent among women with low levels of education, even when maternal smoking (which tends to be more prevalent among women with low education) was factored out.

## Time Trends (see Table 4.3.1.1, 4.3.1.2, 4.3.1.3)



- The singleton small-for-gestational-age rate decreased between 1998 and 2002 and increased slightly between 2004 and 2006. In 2007, the rate was 8.1 (per 100 live singleton births) in Alberta.
- In 2007, the singleton small-for-gestational-age rate was 11.0 (per 100 singleton live births) for preterm births, compared with 7.9 for term births. Both term and preterm rates increased in the last few years.
- In 2007, the small-for-gestational-age rate rate for multiples was 7.7 (per 100 multiple live births). This rate is quite variable due to the small number of multiple births, and there are no significant time trends between 1998 and 2007.

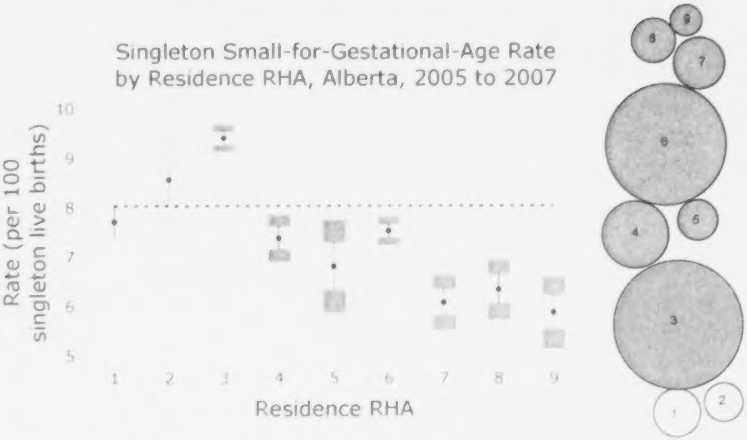
## Age Effects (see Tables 4.3.1.4, 4.3.1.6)



- For 2005 to 2007 combined, the singleton small-for-gestational-age rate was lowest for women between 30 and 39, and highest for women under 25 and over 39 years of age.

# 4.3.1 Small-for-Gestational-Age

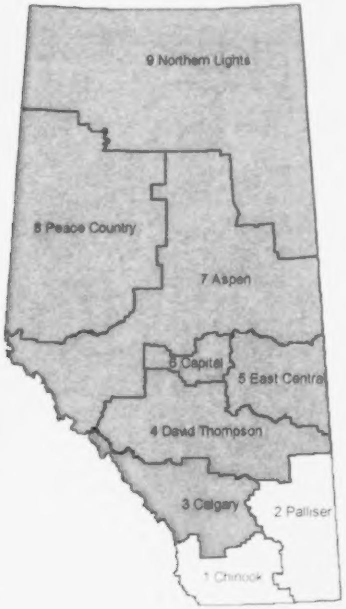
## Regional Data (see Tables 4.3.1.5, 4.3.1.7)



- For 2005 to 2007 combined, the small-for-gestational-age rate was significantly lower than the provincial average in RHAs 4 though 9. The lowest rate was 5.9 (per 100 singleton live births) in RHA 9.
- The rate was significantly higher than the provincial average in RHA 3 (9.4 per 100 singleton live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Singleton Small-for-Gestational-Age Rate, 2005-07 Combined


9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

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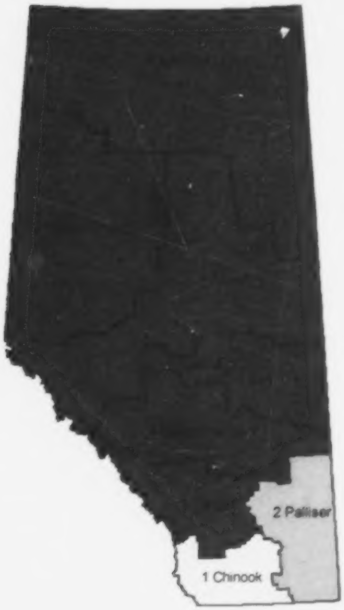
### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

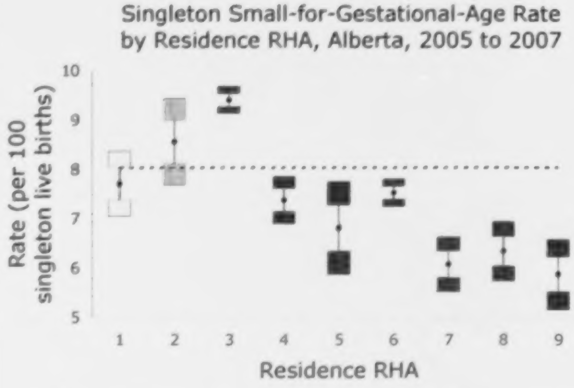
# 4.3.1 Small-for-Gestational-Age

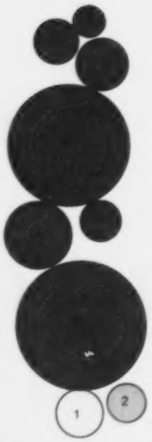
When studied at the age of eight, children who were small-for-gestational age at birth did not differ from appropriate-for-gestational children in terms of general health status, behavioural status, or cognitive or academic achievement. Small-for-gestational-age children did remain physically smaller than the appropriate-for-gestational-age children (Casey, Whiteside-Mansell, Barrett, Bradley, and Gargus, 2006).

**Singleton Small-for-Gestational-Age Rate, 2005-07 Combined**



## Regional Data (see Tables 4.3.1.5, 4.3.1.7)


Singleton Small-for-Gestational-Age Rate by Residence RHA, Alberta, 2005 to 2007



- For 2005 to 2007 combined, the small-for-gestational-age rate was significantly lower than the provincial average in RHAs 4 though 9. The lowest rate was 5.9 (per 100 singleton live births) in RHA 9.
- The rate was significantly higher than the provincial average in RHA 3 (9.4 per 100 singleton live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.3.1.1 Singleton Small-for-Gestational-Age Births and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Singleton small-for-gestational-age live births** | 3,311 | 3,035 | 2,813 | 2,825 | 2,803 | 2,923 | 3,015 | 3,175 | 3,508 | 3,774 |
| **Singleton live births** | 36,527 | 36,749 | 35,527 | 36,086 | 37,072 | 38,574 | 38,933 | 40,249 | 43,217 | 46,774 |
| **Rate (per 100 singleton live births)** | 9.1 | 8.3 | 7.9 | 7.8 | 7.6 | 7.6 | 7.7 | 7.9 | 8.1 | 8.1 |
| **Standard Error (SE)** | 0.15 | 0.14 | 0.14 | 0.14 | 0.14 | 0.13 | 0.14 | 0.13 | 0.13 | 0.13 |

Table 4.3.1.2 Singleton Small-for-Gestational-Age Births and Rate by Preterm/Term, Alberta, 1998 to 2007

| Preterm | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Singleton small-for-gestational-age preterm live births** | 242 | 244 | 228 | 239 | 245 | 233 | 283 | 311 | 331 | 348 |
| **Singleton preterm live births** | 2,281 | 2,393 | 2,487 | 2,488 | 2,606 | 2,712 | 2,854 | 3,053 | 3,122 | 3,170 |
| **Rate (per 100 singleton preterm live births)** | 10.6 | 10.2 | 9.2 | 9.6 | 9.4 | 8.6 | 9.9 | 10.2 | 10.6 | 11.0 |
| **Standard Error (SE)** | 0.64 | 0.62 | 0.58 | 0.59 | 0.57 | 0.54 | 0.56 | 0.55 | 0.55 | 0.56 |

| Term | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Singleton small-for-gestational-age term live births** | 3,067 | 2,788 | 2,579 | 2,581 | 2,556 | 2,690 | 2,730 | 2,863 | 3,175 | 3,426 |
| **Singleton term live births** | 34,221 | 34,331 | 33,009 | 33,577 | 34,451 | 35,843 | 36,065 | 37,177 | 40,088 | 43,597 |
| **Rate (per 100 singleton term live births)** | 9.0 | 8.1 | 7.8 | 7.7 | 7.4 | 7.5 | 7.6 | 7.7 | 7.9 | 7.9 |
| **Standard Error (SE)** | 0.15 | 0.15 | 0.15 | 0.15 | 0.14 | 0.14 | 0.14 | 0.14 | 0.13 | 0.13 |

Table 4.3.1.3 Multiple Small-for-Gestational-Age Births and Rate, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Multiple small-for-gestational-age live births** | 91 | 80 | 95 | 90 | 107 | 81 | 87 | 90 | 100 | 121 |
| **Multiple live births** | 1,002 | 1,029 | 1,098 | 1,140 | 1,221 | 1,294 | 1,359 | 1,338 | 1,442 | 1,574 |
| **Rate (per 100 multiple live births)** | 9.1 | 7.8 | 8.7 | 7.9 | 8.8 | 6.3 | 6.4 | 6.7 | 6.9 | 7.7 |
| **Standard Error (SE)** | 0.91 | 0.83 | 0.85 | 0.80 | 0.81 | 0.67 | 0.66 | 0.68 | 0.67 | 0.67 |

Table 4.3.1.4 Singleton Small-for-Gestational-Age Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Singleton small-for-gestational-age live births** | 607 | 2,245 | 3,318 | 2,788 | 1,234 | 264 | 10,456 |
| **Singleton live births** | 6,806 | 25,161 | 41,380 | 37,338 | 16,450 | 3,102 | 130,237 |
| **Rate (per 100 singleton live births)** | 8.9 | 8.9 | 8.0 | 7.5 | 7.5 | 8.5 | 8.0 |
| **Standard Error (SE)** | 0.35 | 0.18 | 0.13 | 0.14 | 0.21 | 0.50 | 0.08 |

Table 4.3.1.5 Singleton small-for-Gestational-Age Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Singleton small-for-gestational-age live births** | 505 | 356 | 4,503 | 897 | 195 | 2,878 | 453 | 415 | 255 | 10,457 |
| **Singleton live births** | 6,553 | 4,160 | 47,880 | 12,165 | 2,864 | 38,260 | 7,462 | 6,549 | 4,347 | 130,247 |
| **Rate (per 100 singleton live births)** | 7.7 | 8.6 | 9.4 | 7.4 | 6.8 | 7.5 | 6.1 | 6.3 | 5.9 | 8.0 |
| **Standard Error (SE)** | 0.33 | 0.43 | 0.13 | 0.24 | 0.47 | 0.13 | 0.28 | 0.30 | 0.36 | 0.08 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.1.6 Singleton Small-for-Gestational-Age Live Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

| **Singleton small-for-gestational-age live births** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<20** | 294 | 237 | 239 | 216 | 196 | 189 | 179 | 173 | 211 | 223 |
| **20-24** | 720 | 706 | 622 | 646 | 628 | 661 | 646 | 679 | 769 | 797 |
| **25-29** | 1,005 | 899 | 847 | 818 | 824 | 883 | 947 | 996 | 1,122 | 1,200 |
| **30-34** | 831 | 723 | 702 | 725 | 719 | 750 | 770 | 844 | 939 | 1,005 |
| **35-39** | 392 | 393 | 346 | 336 | 354 | 345 | 373 | 399 | 379 | 456 |
| **>39** | 66 | 75 | 57 | 84 | 82 | 95 | 99 | 84 | 88 | 92 |
| **All** | 3,311 | 3,035 | 2,813 | 2,825 | 2,803 | 2,923 | 3,015 | 3,175 | 3,508 | 3,774 |

| **Rate (per 100 singleton live births)** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **<20** | 11.4 | 9.2 | 10.0 | 9.5 | 9.0 | 9.1 | 8.7 | 8.2 | 9.3 | 9.2 |
| **20-24** | 9.5 | 9.1 | 8.5 | 8.8 | 8.3 | 8.4 | 8.4 | 8.7 | 9.1 | 9.0 |
| **25-29** | 8.8 | 7.9 | 7.7 | 7.3 | 7.2 | 7.4 | 7.7 | 7.8 | 8.2 | 8.0 |
| **30-34** | 8.2 | 7.3 | 7.2 | 7.2 | 6.9 | 6.8 | 6.9 | 7.3 | 7.6 | 7.5 |
| **35-39** | 9.4 | 8.9 | 7.9 | 7.6 | 7.9 | 7.4 | 7.9 | 8.0 | 6.9 | 7.6 |
| **>39** | 10.3 | 10.1 | 7.7 | 10.9 | 10.3 | 9.8 | 10.7 | 8.6 | 8.6 | 8.4 |
| **All** | 9.1 | 8.3 | 7.9 | 7.8 | 7.6 | 7.6 | 7.7 | 7.9 | 8.1 | 8.1 |

Table 4.3.1.7 Singleton Small-for-Gestational-Age Live Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

| **Singleton small-for-gestational-age live births** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Chinook** | 151 | 149 | 117 | 137 | 115 | 142 | 142 | 157 | 165 | 183 |
| **Palliser** | 134 | 105 | 105 | 105 | 98 | 102 | 95 | 117 | 118 | 121 |
| **Calgary** | 1,298 | 1,133 | 1,074 | 1,113 | 1,113 | 1,215 | 1,243 | 1,389 | 1,474 | 1,640 |
| **David Thompson** | 313 | 260 | 251 | 224 | 261 | 254 | 262 | 252 | 325 | 320 |
| **East Central** | 73 | 74 | 66 | 65 | 76 | 41 | 68 | 63 | 71 | 61 |
| **Capital** | 924 | 888 | 830 | 827 | 773 | 810 | 843 | 837 | 983 | 1,058 |
| **Aspen** | 193 | 182 | 143 | 162 | 149 | 137 | 164 | 143 | 153 | 157 |
| **Peace Country** | 139 | 141 | 146 | 121 | 140 | 133 | 121 | 137 | 141 | 137 |
| **Northern Lights** | 86 | 102 | 80 | 71 | 78 | 89 | 77 | 80 | 78 | 97 |
| **Alberta** | 3,311 | 3,035 | 2,813 | 2,825 | 2,803 | 2,923 | 3,015 | 3,175 | 3,508 | 3,774 |

| **Rate (per 100 singleton live births)** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Chinook** | 7.6 | 7.4 | 6.3 | 7.2 | 6.0 | 7.0 | 7.2 | 7.7 | 7.6 | 7.8 |
| **Palliser** | 11.0 | 8.8 | 8.9 | 8.8 | 8.3 | 8.4 | 7.7 | 9.0 | 8.9 | 7.9 |
| **Calgary** | 10.4 | 9.0 | 8.5 | 8.8 | 8.5 | 8.7 | 8.8 | 9.3 | 9.3 | 9.6 |
| **David Thompson** | 9.0 | 7.3 | 7.4 | 6.6 | 7.5 | 7.0 | 7.2 | 6.9 | 7.9 | 7.3 |
| **East Central** | 7.4 | 8.0 | 7.6 | 7.6 | 8.0 | 4.7 | 7.4 | 7.1 | 7.4 | 6.0 |
| **Capital** | 8.5 | 8.1 | 7.9 | 7.7 | 7.0 | 7.1 | 7.3 | 7.2 | 7.7 | 7.6 |
| **Aspen** | 7.6 | 7.3 | 6.4 | 6.9 | 6.3 | 6.0 | 7.0 | 6.1 | 6.1 | 6.0 |
| **Peace Country** | 7.5 | 7.4 | 8.2 | 6.5 | 7.5 | 6.7 | 6.4 | 6.8 | 6.3 | 6.0 |
| **Northern Lights** | 8.0 | 9.7 | 7.4 | 6.1 | 6.2 | 7.1 | 5.8 | 5.9 | 5.5 | 6.2 |
| **Alberta** | 9.1 | 8.3 | 7.9 | 7.8 | 7.6 | 7.6 | 7.7 | 7.9 | 8.1 | 8.1 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

# 4.3.2 Low Birth Weight

Low birth weight: *Birth weight of less than 2,500 grams.*

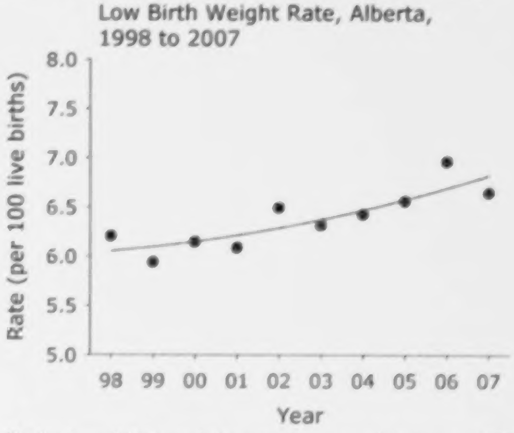
Low birth weight rate: *Number of low birth weight live births per 100 live births.* Since 1990, the rate has included birth weights under 500 grams.

Low birth weight infants may be small for gestational age, or preterm, or both. These types of low birth weight have different underlying causes and different effects on later development (Miller & Chen, 1998; Wallace & McCarton, 1997). Care should be taken in the interpretation of simple low birth weight rates, which reflect the combined effect of restricted growth for gestational age and preterm birth.

The Consensus Statement on Healthy Mothers, Healthy Babies: How to Prevent Low Birth Weight (Institute of Health Economics et al., 2007) makes a number of recommendations on how to reduce low birth weight rates in Alberta.

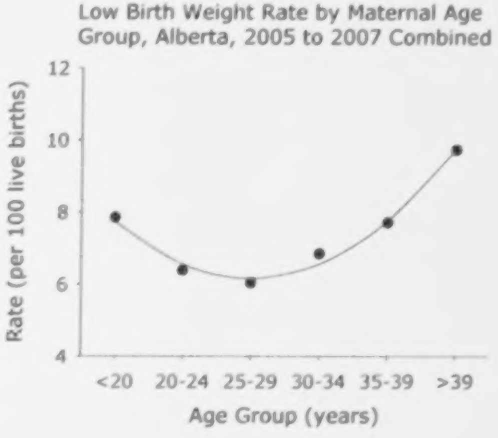
Low birth weight is associated with many negative outcomes, the severity of which depends on both gestational age and birth weight (with more serious outcomes for very small or very preterm babies). Outcomes include fetal and neonatal morbidity and mortality, restricted growth, impaired cognitive development, and chronic diseases in later life such as asthma, diabetes, hypertension, and cardiovascular disease (United Nations Children's Fund and World Health Organization, 2004; Wilcox, 2001).

## Time Trends (see Tables 4.3.2.1, 4.3.2.2, 4.3.2.3, 4.3.2.6)


Low Birth Weight Rate, Alberta, 1998 to 2007

- Overall, the low birth weight rate increased between 1998 and 2007, although the 2007 rate was slightly lower than the 2006 rates. In 2007, 6.6% of live births in Alberta were low birth weight.
- While only 2.0% of terms births in 2007 were low birth weight, more than half (57.5%) of preterm births were low birth weight.
- Multiple births are also far more likely to be low birth weight than singleton births. In 2007, the 53.0% of live multiple births were low birth weight, compared with 5.1% of singleton births.

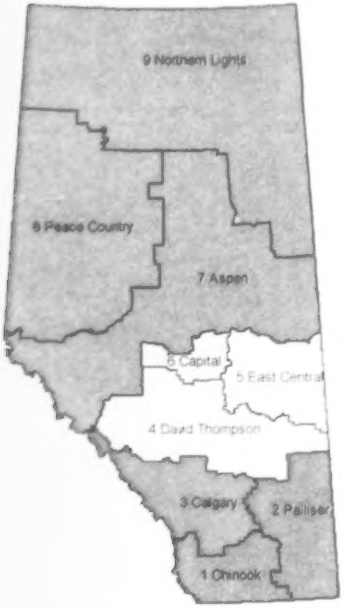
## Age Effects (see Table 4.3.2.4, 4.3.2.7)


Low Birth Weight Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

- Women in their 20s have the lowest rates of low birth weight, with elevated rates for women 35 and older (especially 40 and older) and teen mothers. Almost one in ten live births to women 40 and older between 2005 and 2007 were low birth weight.

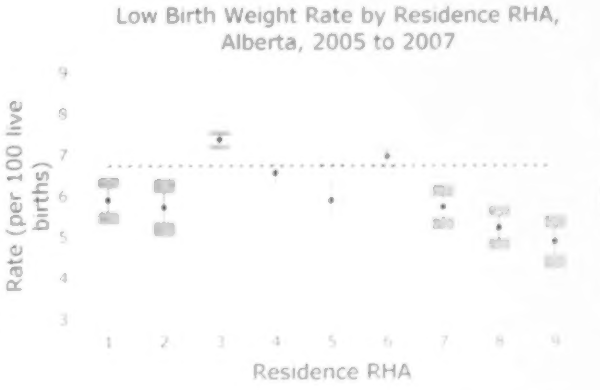
# 4.3.2 Low Birth Weight

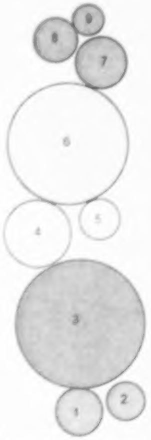
Low Birth Weight Rate, 2005-07 Combined


9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Regional Data (see Table 4.3.2.5, 4.3.2.8)

- The low birth weight rate was lower than the provincial average for 2005 to 2007 combined in RHAs 1, 2, 7, 8, and 9, with the lowest rate in RHA 9 (4.9% of live births).
- The rate was higher than the provincial average in RHA 3 (7.1% of live births).





See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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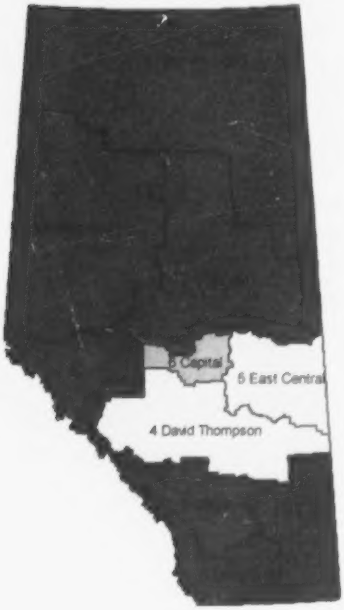
### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

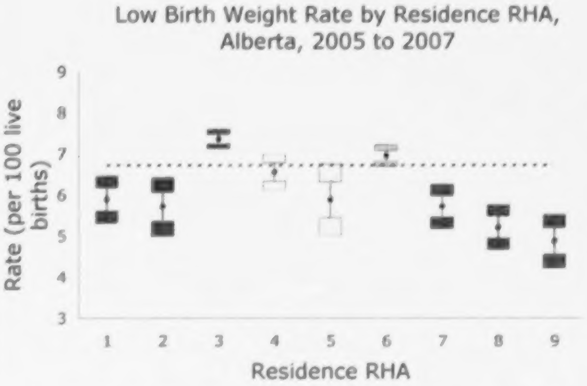
# 4.3.2 Low Birth Weight

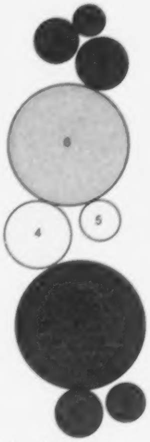
Maternal risk factors for low birth weight include (but are not limited to) smoking, age under 20 or over 35, interval between pregnancies of less than 18 months or more than 60 months, previous preterm birth, underweight prior to pregnancy, stress, physically demanding work, sexually transmitted infection, pre-existing or pregnancy-induced medical conditions, use of assisted reproductive technology, and multiple gestation (Institute for Health Economics, et al., 2007).

Low Birth Weight Rate, 2005-07 Combined



## Regional Data (see Table 4.3.2.5, 4.3.2.8)





- The low birth weight rate was lower than the provincial average for 2005 to 2007 combined in RHAs 1, 2, 7, 8, and 9, with the lowest rate in RHA 9 (4.9% of live births).
- The rate was higher than the provincial average in RHA 3 (7.1% of live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

## 4.3.2 Low Birth Weight

The low birth weight rate is increasing in both Canada and Alberta. In 2006, the rate was 6.9 (per 100 live births) in Alberta and 6.1 in Canada (Statistics Canada, 2008c).

Low Birth Weight Rate,
Alberta and Canada, 1997 to 2006

Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)

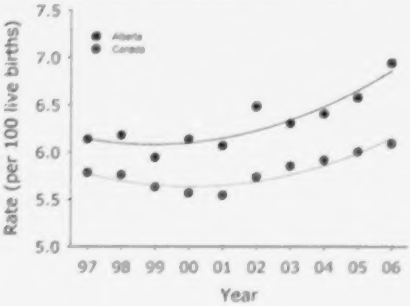


Table 4.3.2.1 Low Birth Weight Births and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low birth weight live births** | 2,328 | 2,243 | 2,250 | 2,265 | 2,486 | 2,517 | 2,589 | 2,728 | 3,109 | 3,213 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 6.2 | 5.9 | 6.1 | 6.1 | 6.5 | 6.3 | 6.4 | 6.6 | 7.0 | 6.6 |
| **Standard Error (SE)** | 0.12 | 0.12 | 0.13 | 0.12 | 0.13 | 0.12 | 0.12 | 0.12 | 0.12 | 0.11 |

Table 4.3.2.2 Low Birth Weight Births and Rate by Preterm/Term, Alberta, 1998 to 2007

| Preterm | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low birth weight preterm live births** | 1,578 | 1,605 | 1,619 | 1,632 | 1,778 | 1,896 | 1,929 | 2,032 | 2,269 | 2,331 |
| **Preterm live births** | 2,815 | 2,936 | 3,098 | 3,108 | 3,300 | 3,521 | 3,666 | 3,781 | 3,957 | 4,054 |
| **Rate (per 100 preterm live births)** | 56.1 | 54.7 | 52.3 | 52.5 | 53.9 | 53.8 | 52.6 | 53.7 | 57.3 | 57.5 |
| **Standard Error (SE)** | 0.94 | 0.92 | 0.90 | 0.90 | 0.87 | 0.84 | 0.82 | 0.81 | 0.79 | 0.78 |

| Term | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low birth weight term live births** | 750 | 638 | 630 | 631 | 708 | 621 | 660 | 696 | 840 | 882 |
| **Term live births** | 34,689 | 34,817 | 33,496 | 34,097 | 34,978 | 36,328 | 36,612 | 37,787 | 40,695 | 44,287 |
| **Rate (per 100 term live births)** | 2.2 | 1.8 | 1.9 | 1.9 | 2.0 | 1.7 | 1.8 | 1.8 | 2.1 | 2.0 |
| **Standard Error (SE)** | 0.08 | 0.07 | 0.07 | 0.07 | 0.08 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |

Table 4.3.2.3 Low Birth Weight Births and Rate by Plurality, Alberta, 1998 to 2007

| Multiple | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low birth weight multiple live births** | 535 | 510 | 565 | 576 | 679 | 702 | 720 | 696 | 764 | 834 |
| **Multiple live births** | 1,002 | 1,029 | 1,098 | 1,140 | 1,221 | 1,294 | 1,359 | 1,338 | 1,442 | 1,574 |
| **Rate (per 100 multiple live births)** | 53.4 | 49.6 | 51.5 | 50.5 | 55.6 | 54.3 | 53.0 | 52.0 | 53.0 | 53.0 |
| **Standard Error (SE)** | 1.58 | 1.56 | 1.51 | 1.48 | 1.42 | 1.38 | 1.35 | 1.37 | 1.31 | 1.26 |

| Singleton | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low birth weight singleton live births** | 1,793 | 1,733 | 1,685 | 1,689 | 1,807 | 1,815 | 1,869 | 2,032 | 2,345 | 2,379 |
| **Singleton live births** | 36,527 | 36,749 | 35,527 | 36,086 | 37,072 | 38,574 | 38,933 | 40,249 | 43,217 | 46,774 |
| **Rate (per 100 singleton live births)** | 4.9 | 4.7 | 4.7 | 4.7 | 4.9 | 4.7 | 4.8 | 5.0 | 5.4 | 5.1 |
| **Standard Error (SE)** | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.10 |

Table 4.3.2.4 Low Birth Weight Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Low birth weight live births** | 543 | 1,639 | 2,564 | 2,656 | 1,326 | 321 | 9,049 |
| **Live births** | 6,930 | 25,713 | 42,562 | 38,866 | 17,216 | 3,302 | 134,591 |
| **Rate (per 100 live births)** | 7.8 | 6.4 | 6.0 | 6.8 | 7.7 | 9.7 | 6.7 |
| **Standard Error (SE)** | 0.32 | 0.15 | 0.12 | 0.13 | 0.20 | 0.52 | 0.07 |

Table 4.3.2.5 Low Birth Weight Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Low birth weight live births** | 399 | 245 | 3,644 | 823 | 174 | 2,756 | 439 | 352 | 218 | 9,050 |
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,601 |
| **Rate (per 100 live births)** | 5.9 | 5.7 | 7.4 | 6.6 | 5.9 | 7.0 | 5.7 | 5.2 | 4.9 | 6.7 |
| **Standard Error (SE)** | 0.29 | 0.35 | 0.12 | 0.22 | 0.43 | 0.13 | 0.27 | 0.27 | 0.32 | 0.07 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.2.6 Low Birth Weight Live Births by Birth Weight Categories, Alberta, 1998 to 2007

| <500 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births <500 grams** | 30 | 31 | 48 | 45 | 64 | 65 | 75 | 71 | 66 | 77 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 0.08 | 0.08 | 0.13 | 0.12 | 0.17 | 0.16 | 0.19 | 0.17 | 0.15 | 0.16 |
| **Standard Error (SE)** | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |

| <1000 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births <1000 grams** | 166 | 184 | 214 | 196 | 226 | 214 | 230 | 266 | 255 | 270 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 0.4 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 |
| **Standard Error (SE)** | 0.03 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 |

| <1500 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births <1500 grams** | 369 | 375 | 424 | 412 | 448 | 442 | 453 | 522 | 528 | 546 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 1.0 | 1.0 | 1.2 | 1.1 | 1.2 | 1.1 | 1.1 | 1.3 | 1.2 | 1.1 |
| **Standard Error (SE)** | 0.05 | 0.05 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |

| <2500 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births <2500 grams** | 2330 | 2243 | 2251 | 2267 | 2486 | 2517 | 2589 | 2728 | 3109 | 3214 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 6.2 | 5.9 | 6.1 | 6.1 | 6.5 | 6.3 | 6.4 | 6.6 | 7.0 | 6.6 |
| **Standard Error (SE)** | 0.12 | 0.12 | 0.13 | 0.12 | 0.13 | 0.12 | 0.12 | 0.12 | 0.12 | 0.11 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.2.7 Low Birth Weight Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

| Low birth weight live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 206 | 152 | 170 | 159 | 155 | 154 | 136 | 165 | 200 | 178 |
| 20-24 | 449 | 451 | 447 | 458 | 538 | 532 | 531 | 460 | 613 | 566 |
| 25-29 | 650 | 614 | 605 | 605 | 677 | 691 | 710 | 822 | 849 | 893 |
| 30-34 | 622 | 651 | 599 | 583 | 679 | 699 | 688 | 768 | 922 | 966 |
| 35-39 | 340 | 317 | 352 | 384 | 360 | 352 | 417 | 410 | 425 | 491 |
| >39 | 59 | 57 | 77 | 75 | 77 | 89 | 107 | 103 | 100 | 118 |
| **All** | 2,328 | 2,243 | 2,250 | 2,265 | 2,486 | 2,517 | 2,589 | 2,728 | 3,109 | 3,213 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 7.9 | 5.8 | 7.0 | 6.9 | 7.0 | 7.3 | 6.5 | 7.7 | 8.7 | 7.2 |
| 20-24 | 5.8 | 5.7 | 6.0 | 6.1 | 6.9 | 6.6 | 6.8 | 5.8 | 7.1 | 6.2 |
| 25-29 | 5.5 | 5.3 | 5.4 | 5.3 | 5.7 | 5.6 | 5.6 | 6.3 | 6.1 | 5.8 |
| 30-34 | 5.9 | 6.3 | 6.0 | 5.6 | 6.2 | 6.1 | 5.9 | 6.4 | 7.1 | 7.0 |
| 35-39 | 7.8 | 6.9 | 7.6 | 8.3 | 7.6 | 7.1 | 8.4 | 7.8 | 7.4 | 7.8 |
| >39 | 8.8 | 7.4 | 9.9 | 9.3 | 9.3 | 8.9 | 10.8 | 9.9 | 9.3 | 10.0 |
| **All** | 6.2 | 5.9 | 6.1 | 6.1 | 6.5 | 6.3 | 6.4 | 6.6 | 7.0 | 6.6 |

Table 4.3.2.8 Low Birth Weight Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

| Low birth weight live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 95 | 128 | 118 | 114 | 99 | 111 | 111 | 112 | 146 | 141 |
| Palliser | 72 | 75 | 58 | 73 | 82 | 82 | 57 | 79 | 80 | 86 |
| Calgary | 891 | 806 | 861 | 873 | 992 | 990 | 1,046 | 1,133 | 1,222 | 1,289 |
| David Thompson | 210 | 199 | 184 | 215 | 229 | 204 | 214 | 238 | 307 | 278 |
| East Central | 49 | 49 | 56 | 57 | 65 | 66 | 73 | 63 | 65 | 46 |
| Capital | 711 | 670 | 676 | 669 | 722 | 753 | 774 | 837 | 920 | 999 |
| Aspen | 138 | 148 | 136 | 120 | 138 | 149 | 155 | 119 | 162 | 158 |
| Peace Country | 105 | 100 | 103 | 91 | 94 | 95 | 106 | 91 | 130 | 131 |
| Northern Lights | 56 | 68 | 57 | 53 | 65 | 67 | 53 | 56 | 77 | 85 |
| **Alberta** | 2,328 | 2,243 | 2,250 | 2,265 | 2,486 | 2,517 | 2,589 | 2,728 | 3,109 | 3,213 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 4.7 | 6.2 | 6.1 | 5.8 | 5.0 | 5.3 | 5.4 | 5.3 | 6.5 | 5.8 |
| Palliser | 5.8 | 6.1 | 4.8 | 5.9 | 6.7 | 6.5 | 4.5 | 5.9 | 5.9 | 5.5 |
| Calgary | 6.9 | 6.2 | 6.6 | 6.7 | 7.3 | 6.8 | 7.2 | 7.3 | 7.5 | 7.3 |
| David Thompson | 5.9 | 5.5 | 5.3 | 6.2 | 6.3 | 5.5 | 5.7 | 6.2 | 7.2 | 6.2 |
| East Central | 4.9 | 5.1 | 6.2 | 6.5 | 6.7 | 7.3 | 7.7 | 6.8 | 6.6 | 4.4 |
| Capital | 6.4 | 5.9 | 6.3 | 6.1 | 6.4 | 6.4 | 6.5 | 6.9 | 7.0 | 6.9 |
| Aspen | 5.3 | 5.8 | 6.0 | 5.0 | 5.7 | 6.2 | 6.5 | 5.0 | 6.3 | 5.8 |
| Peace Country | 5.5 | 5.1 | 5.7 | 4.8 | 4.9 | 4.7 | 5.4 | 4.4 | 5.7 | 5.5 |
| Northern Lights | 5.1 | 6.4 | 5.1 | 4.4 | 5.0 | 5.2 | 3.9 | 4.0 | 5.3 | 5.2 |
| **Alberta** | 6.2 | 5.9 | 6.1 | 6.1 | 6.5 | 6.3 | 6.4 | 6.6 | 7.0 | 6.6 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

## 4.3.3 Large-for-Gestational-Age

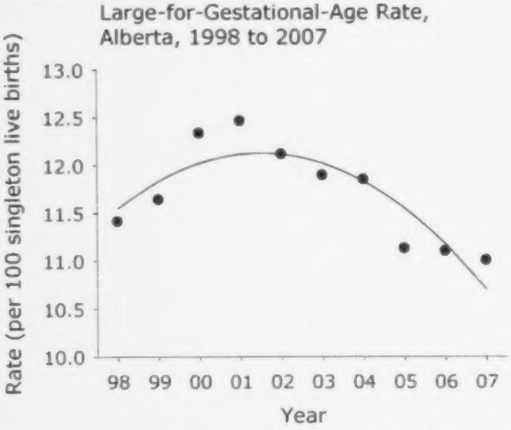
Large-for-gestational-age infants have *a birth weight above the 90th percentile of appropriate-for-gestational-age infants* (see Alberta norms in Robertson, Svenson, & Kyle, 2002 for Alberta norms).

Large-for-gestational-age rate: *Number of singleton large-for-gestational-age live births per 100 singleton live births.*

Macrosomic infants (whether large-for-gestational-age or high birth weight) have increased risk of infant mortality and shoulder dystocia. Macrosomic infants are more likely than normal weight infants to become overweight children. Maternal morbidity associated with delivery of a macrosomic infant includes genital tract injury, prolonged labour, postpartum bleeding, and cesarean delivery (Surkan, Chung-Cheng, Johansson, Dickman, & Cnattingius, 2005).

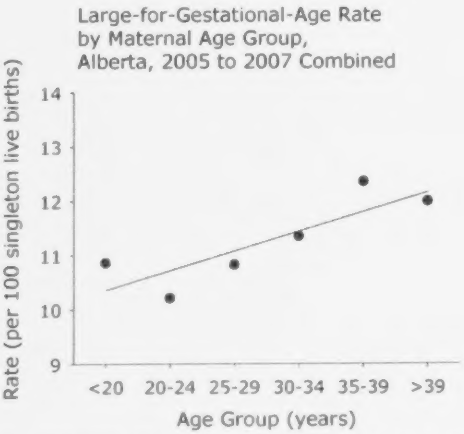
Both genetic and environmental factors influence rates of macrosomia. Recent increases in macrosomia rates worldwide are related to increases in maternal overweight and diabetes (whether pre-existing or gestational; Henriksen, 2008).

**Time Trends** (see Tables 4.3.3.1)



- The singleton large-for-gestational-age rate in Alberta increased to 2001, then decreased to 2005, and stabilized. In 2007, the rate was 11.0 (per 100 singleton live births).

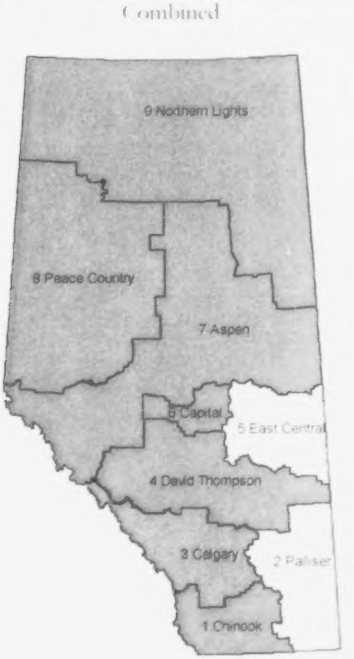
**Age Effects** (see Table 4.3.3.2)



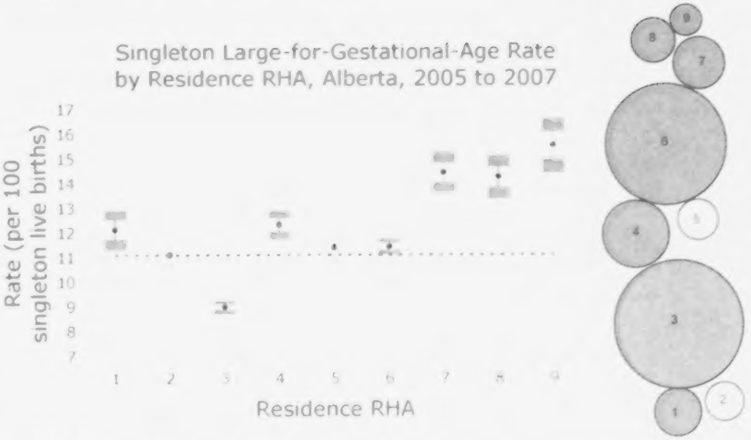
- Large-for-gestational-age births are more likely as maternal age increases, but the effect of maternal age is not substantial.

# 4.3.3 Large-for-Gestational-Age

Large-for-Gestational-Age Rate, 2005-07
Combined


9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Regional Data (see Table 4.3.3.3)



- Between 2005 and 2007, the singleton large-for-gestational-age rate was significantly lower than the provincial average in RHA 3 (9.0 per 100 singleton live births).
- The rate was significantly higher than the provincial average in RHAs 1, 4, 6, 7, 8, and 9 during that time period, and the highest rate was in RHA 7 (15.5 per 100 singleton live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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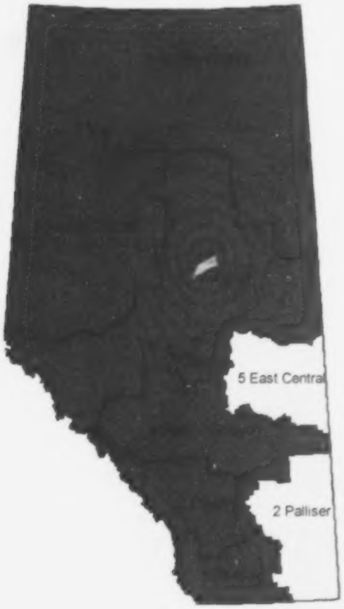
### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

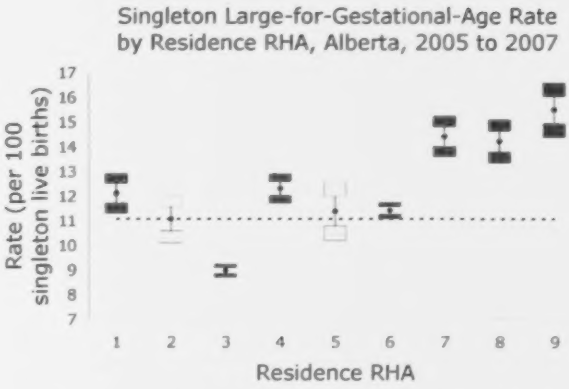
## 4.3.3 Large-for-Gestational-Age

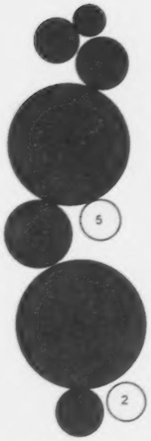
The increase in large-for-gestational-age birth in Canada between 1976 and 1996 was associated with increases in maternal weight, weight gain during pregnancy, and gestational diabetes rates, in concert with decreasing maternal smoking and post-term delivery rates (Kramer, Morin, Yang, Platt, Usher, McNamara et al., 2002).

Large-for-Gestational-Age Rate, 2005-07 Combined



### Regional Data (see Table 4.3.3.3)





- Between 2005 and 2007, the singleton large-for-gestational-age rate was significantly lower than the provincial average in RHA 3 (9.0 per 100 singleton live births).
- The rate was significantly higher than the provincial average in RHAs 1, 4, 6, 7, 8, and 9 during that time period, and the highest rate was in RHA 7 (15.5 per 100 singleton live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.3.3.1 Singleton Large-for-Gestational-Age Births and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Singleton large-for-gestational-age live births** | 4,169 | 4,278 | 4,382 | 4,498 | 4,492 | 4,589 | 4,615 | 4,480 | 4,799 | 5,148 |
| **Singleton live births** | 36,527 | 36,749 | 35,527 | 36,086 | 37,072 | 38,574 | 38,933 | 40,249 | 43,217 | 46,774 |
| **Rate (per 100 singleton live births)** | 11.4 | 11.6 | 12.3 | 12.5 | 12.1 | 11.9 | 11.9 | 11.1 | 11.1 | 11.0 |
| **Standard Error (SE)** | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.16 | 0.16 | 0.16 | 0.15 | 0.14 |

Table 4.3.3.2 Singleton Large-for-Gestational-Age Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Singleton large-for-gestational-age live births** | 739 | 2,569 | 4,479 | 4,236 | 2,032 | 372 | 14,427 |
| **Singleton live births** | 6,806 | 25,161 | 41,380 | 37,338 | 16,450 | 3,102 | 130,237 |
| **Rate (per 100 singleton live births)** | 10.9 | 10.2 | 10.8 | 11.3 | 12.4 | 12.0 | 11.1 |
| **Standard Error (SE)** | 0.38 | 0.19 | 0.15 | 0.16 | 0.26 | 0.58 | 0.09 |

Table 4.3.3.3 Singleton Large-for-Gestational-Age Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Singleton large-for-gestational-age live births** | 794 | 461 | 4,298 | 1,498 | 326 | 4,368 | 1,076 | 932 | 674 | 14,428 |
| **Singleton live births** | 6,553 | 4,160 | 47,880 | 12,165 | 2,864 | 38,260 | 7,462 | 6,549 | 4,347 | 130,247 |
| **Rate (per 100 singleton live births)** | 12.1 | 11.1 | 9.0 | 12.3 | 11.4 | 11.4 | 14.4 | 14.2 | 15.5 | 11.1 |
| **Standard Error (SE)** | 0.40 | 0.49 | 0.13 | 0.30 | 0.59 | 0.16 | 0.41 | 0.43 | 0.55 | 0.09 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.3.4 Singleton Large-for-Gestational-Age Live Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

| Singleton large-for-gestational-Age live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 240 | 222 | 240 | 249 | 217 | 211 | 227 | 241 | 258 | 240 |
| 20-24 | 711 | 788 | 789 | 814 | 842 | 827 | 800 | 823 | 834 | 912 |
| 25-29 | 1,359 | 1,352 | 1,363 | 1,416 | 1,368 | 1,389 | 1,422 | 1,366 | 1,499 | 1,614 |
| 30-34 | 1,233 | 1,263 | 1,293 | 1,327 | 1,371 | 1,450 | 1,447 | 1,331 | 1,426 | 1,479 |
| 35-39 | 530 | 554 | 581 | 610 | 592 | 582 | 612 | 594 | 664 | 774 |
| >39 | 93 | 99 | 116 | 81 | 102 | 130 | 106 | 125 | 118 | 129 |
| All | 4,169 | 4,278 | 4,382 | 4,498 | 4,492 | 4,589 | 4,615 | 4,480 | 4,799 | 5,148 |

| Rate (per 100 singleton live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 9.3 | 8.6 | 10.0 | 10.9 | 9.9 | 10.1 | 11.0 | 11.4 | 11.4 | 9.9 |
| 20-24 | 9.4 | 10.2 | 10.8 | 11.1 | 11.1 | 10.6 | 10.4 | 10.5 | 9.9 | 10.3 |
| 25-29 | 11.9 | 11.9 | 12.4 | 12.7 | 11.9 | 11.6 | 11.5 | 10.7 | 11.0 | 10.7 |
| 30-34 | 12.2 | 12.8 | 13.3 | 13.1 | 13.1 | 13.2 | 12.9 | 11.5 | 11.5 | 11.1 |
| 35-39 | 12.7 | 12.5 | 13.2 | 13.9 | 13.2 | 12.4 | 13.0 | 11.9 | 12.2 | 12.9 |
| >39 | 14.6 | 13.3 | 15.6 | 10.5 | 12.8 | 13.4 | 11.4 | 12.7 | 11.6 | 11.7 |
| All | 11.4 | 11.6 | 12.3 | 12.5 | 12.1 | 11.9 | 11.9 | 11.1 | 11.1 | 11.0 |

Table 4.3.3.5 Singleton Large-for-Gestational-Age Live Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

| Singleton large-for-gestational-Age live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 274 | 253 | 290 | 237 | 251 | 258 | 270 | 263 | 263 | 268 |
| Palliser | 119 | 120 | 141 | 142 | 143 | 139 | 127 | 134 | 167 | 160 |
| Calgary | 1,186 | 1,271 | 1,329 | 1,317 | 1,316 | 1,375 | 1,370 | 1,353 | 1,432 | 1,513 |
| David Thompson | 443 | 445 | 460 | 518 | 483 | 481 | 491 | 470 | 511 | 517 |
| East Central | 125 | 104 | 102 | 111 | 118 | 112 | 114 | 97 | 100 | 129 |
| Capital | 1,310 | 1,362 | 1,327 | 1,332 | 1,376 | 1,387 | 1,388 | 1,368 | 1,390 | 1,610 |
| Aspen | 356 | 339 | 337 | 348 | 364 | 360 | 357 | 320 | 372 | 384 |
| Peace Country | 217 | 225 | 226 | 305 | 259 | 299 | 294 | 273 | 338 | 321 |
| Northern Lights | 138 | 158 | 170 | 188 | 181 | 178 | 203 | 202 | 226 | 246 |
| Alberta | 4,169 | 4,278 | 4,382 | 4,498 | 4,492 | 4,589 | 4,615 | 4,480 | 4,799 | 5,148 |

| Rate (per 100 singleton live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 13.8 | 12.6 | 15.5 | 12.5 | 13.2 | 12.6 | 13.6 | 12.9 | 12.1 | 11.4 |
| Palliser | 9.8 | 10.0 | 12.0 | 12.0 | 12.1 | 11.4 | 10.3 | 10.3 | 12.5 | 10.5 |
| Calgary | 9.5 | 10.1 | 10.5 | 10.4 | 10.0 | 9.9 | 9.7 | 9.0 | 9.1 | 8.8 |
| David Thompson | 12.8 | 12.6 | 13.6 | 15.3 | 13.9 | 13.3 | 13.4 | 12.8 | 12.4 | 11.8 |
| East Central | 12.7 | 11.2 | 11.7 | 13.0 | 12.4 | 12.9 | 12.5 | 11.0 | 10.4 | 12.6 |
| Capital | 12.0 | 12.3 | 12.7 | 12.4 | 12.5 | 12.2 | 12.1 | 11.7 | 11.0 | 11.6 |
| Aspen | 14.0 | 13.7 | 15.1 | 14.9 | 15.5 | 15.7 | 15.3 | 13.7 | 14.9 | 14.6 |
| Peace Country | 11.6 | 11.9 | 12.7 | 16.4 | 13.9 | 15.1 | 15.4 | 13.5 | 15.1 | 14.0 |
| Northern Lights | 12.8 | 15.0 | 15.7 | 16.0 | 14.5 | 14.2 | 15.3 | 14.9 | 15.9 | 15.7 |
| Alberta | 11.4 | 11.6 | 12.3 | 12.5 | 12.1 | 11.9 | 11.9 | 11.1 | 11.1 | 11.0 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

## 4.3.4 High Birth Weight

High birth weight infants *weigh 4,000 grams or more at birth.*

Very high birth weight infants *weigh 4,500 grams or more at birth.*

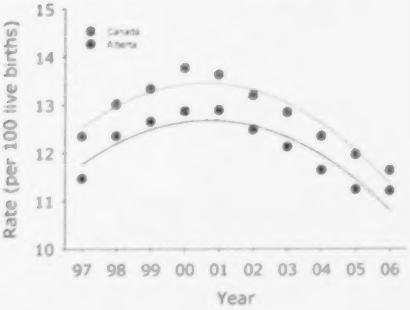
High birth weight rate: *Number of high birth weight births per 100 live births.*

Almost three-quarters of high birth weight infants are large-for-gestational-age; the remaining one-quarter of high birth weight infants are between the 50th and 90th percentiles of weight for gestational age. Virtually all high birth weight infants are born at term or post-term, whereas large-for-gestational-age infants span the range of gestational ages.

The high birth weight rate followed a similar trend in Alberta and Canada between 1997 and 2006, but the Alberta rate was consistently lower than the overall rate for Canada. The rate peaked in 2000 and 2001, and declined thereafter. In 2006, the high birth weight rate was 11.2 in Alberta and 11.6 in Canada (Statistics Canada, 2008c).

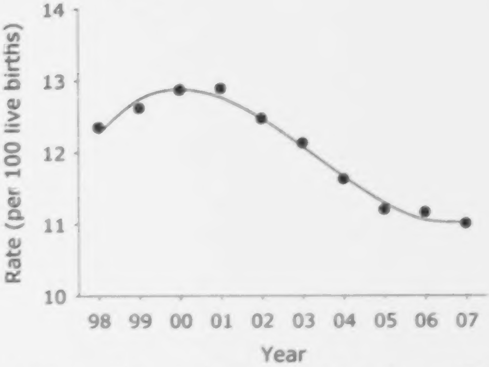
High Birth Weight Rate, Alberta and Canada, 1997 to 2006

Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)



### Time Trends (see Table 4.3.4.1)

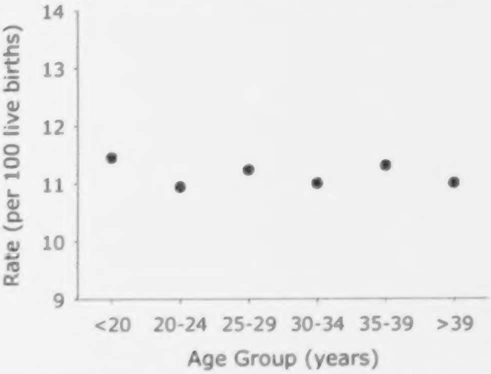
High Birth Weight Rate, Alberta, 1998 to 2007



- The high birth weight rate increased slightly from 1998 to 2000, and decreased from 2002 to 2005 before stabilizing in 2006 and 2007. In 2007, the rate was 11.0 (per 100 live births).
- The rate of births 4,500 grams or over (very high birth weight births) showed a similar pattern, with a rate of 1.8 in 2007.

### Age Effects (see Table 4.3.4.2)

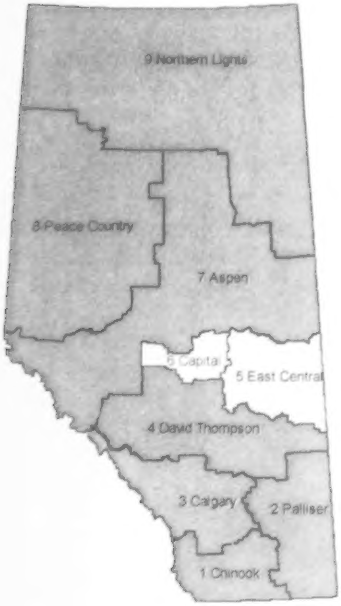
High Birth Weight Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined



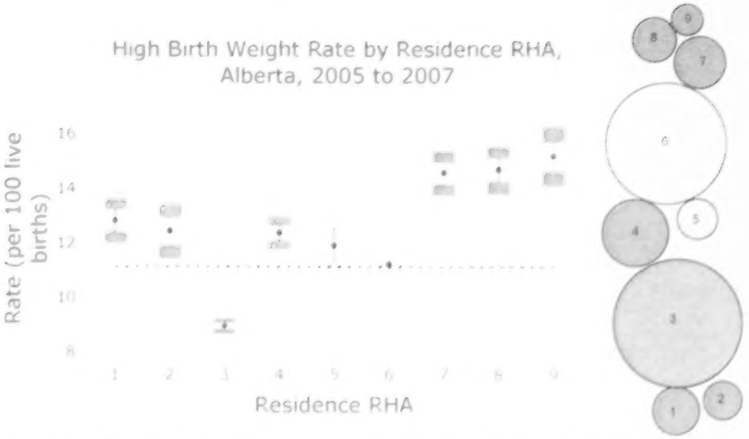
- Maternal age was unrelated to the rate of high birth weight in Alberta between 2005 and 2007.

# 4.3.4 High Birth Weight

High Birth Weight Rate, 2005-07 Combined


9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Regional Data (see Table 4.3.4.3)



- For 2005 to 2007 combined, the high birth weight rate was significantly lower than the provincial average in RHA 3 (9.0 per 100 live births).
- The rate was significantly higher than the provincial average in RHAs 1, 2, 4, 7, 8, and 9 between 2005 and 2007, with the highest rate (15.2) in RHA 9.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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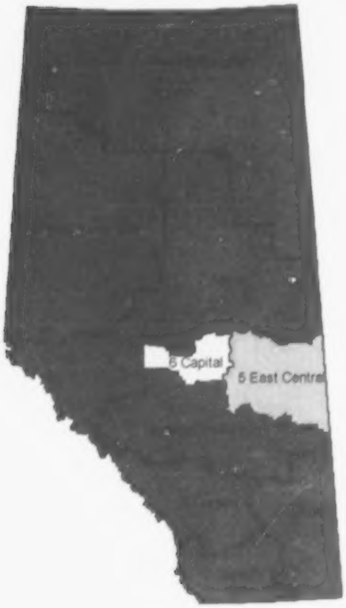
### Limitations and Methodology Notes

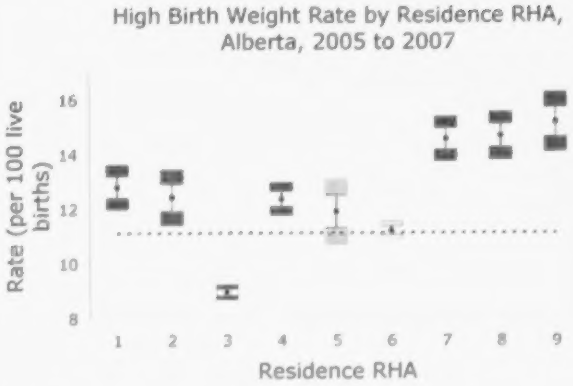
See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

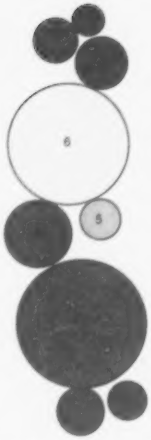
# 4.3.4 High Birth Weight

High Birth Weight Rate, 2005-07 Combined



## Regional Data (see Table 4.3.4.3)





- For 2005 to 2007 combined, the high birth weight rate was significantly lower than the provincial average in RHA 3 (9.0 per 100 live births).
- The rate was significantly higher than the provincial average in RHAs 1, 2, 4, 7, 8, and 9 between 2005 and 2007, with the highest rate (15.2) in RHA 9.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.3.4.1 High Birth Weight Births and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **High birth weight live births** | 4,633 | 4,764 | 4,713 | 4,796 | 4,773 | 4,834 | 4,684 | 4,657 | 4,983 | 5,321 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 12.3 | 12.6 | 12.9 | 12.9 | 12.5 | 12.1 | 11.6 | 11.2 | 11.2 | 11.0 |
| **Standard Error (SE)** | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.16 | 0.16 | 0.15 | 0.15 | 0.14 |

Table 4.3.4.2 High Birth Weight Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **High birth weight live births** | 793 | 2,811 | 4,777 | 4,272 | 1,945 | 363 | 14,961 |
| **Live births** | 6,930 | 25,713 | 42,562 | 38,866 | 17,216 | 3,302 | 134,591 |
| **Rate (per 100 live births)** | 11.4 | 10.9 | 11.2 | 11.0 | 11.3 | 11.0 | 11.1 |
| **Standard Error (SE)** | 0.38 | 0.19 | 0.15 | 0.16 | 0.24 | 0.54 | 0.09 |

Table 4.3.4.3 High Birth Weight Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **High birth weight live births** | 867 | 533 | 4,431 | 1,553 | 352 | 4,440 | 1,117 | 990 | 678 | 14,961 |
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,601 |
| **Rate (per 100 live births)** | 12.8 | 12.4 | 9.0 | 12.4 | 11.9 | 11.2 | 14.6 | 14.7 | 15.2 | 11.1 |
| **Standard Error (SE)** | 0.41 | 0.50 | 0.13 | 0.29 | 0.60 | 0.16 | 0.40 | 0.43 | 0.54 | 0.09 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release

**Notes:** Data include Alberta residents only

Totals for age groups and RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.3.4.4 High Birth Weight Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

| High birth weight live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 274 | 237 | 247 | 291 | 240 | 245 | 258 | 268 | 254 | 271 |
| 20-24 | 819 | 925 | 894 | 914 | 928 | 902 | 869 | 895 | 940 | 976 |
| 25-29 | 1,518 | 1,530 | 1,461 | 1,494 | 1,470 | 1,481 | 1,441 | 1,448 | 1,594 | 1,735 |
| 30-34 | 1,373 | 1,363 | 1,409 | 1,417 | 1,433 | 1,473 | 1,435 | 1,359 | 1,427 | 1,486 |
| 35-39 | 554 | 599 | 602 | 600 | 600 | 613 | 581 | 566 | 652 | 727 |
| >39 | 93 | 110 | 100 | 80 | 102 | 120 | 100 | 121 | 116 | 126 |
| All | 4,633 | 4,764 | 4,713 | 4,796 | 4,773 | 4,834 | 4,684 | 4,657 | 4,983 | 5,321 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 10.5 | 9.1 | 10.1 | 12.6 | 10.8 | 11.5 | 12.3 | 12.5 | 11.0 | 10.9 |
| 20-24 | 10.6 | 11.8 | 12.0 | 12.1 | 11.9 | 11.2 | 11.1 | 11.2 | 10.9 | 10.7 |
| 25-29 | 13.0 | 13.1 | 12.9 | 13.0 | 12.4 | 12.0 | 11.4 | 11.0 | 11.4 | 11.2 |
| 30-34 | 13.1 | 13.3 | 14.0 | 13.5 | 13.1 | 12.9 | 12.3 | 11.3 | 11.0 | 10.7 |
| 35-39 | 12.8 | 13.0 | 13.1 | 13.0 | 12.7 | 12.4 | 11.7 | 10.8 | 11.4 | 11.6 |
| >39 | 13.9 | 14.3 | 12.8 | 9.9 | 12.3 | 12.0 | 10.1 | 11.6 | 10.8 | 10.6 |
| All | 12.3 | 12.6 | 12.9 | 12.9 | 12.5 | 12.1 | 11.6 | 11.2 | 11.2 | 11.0 |

Table 4.3.4.5 High Birth Weight Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

| High birth weight live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 290 | 283 | 318 | 269 | 286 | 282 | 264 | 278 | 285 | 304 |
| Palliser | 142 | 150 | 171 | 162 | 173 | 160 | 153 | 161 | 190 | 182 |
| Calgary | 1,381 | 1,456 | 1,427 | 1,414 | 1,387 | 1,490 | 1,380 | 1,442 | 1,480 | 1,509 |
| David Thompson | 507 | 509 | 487 | 553 | 509 | 490 | 527 | 480 | 527 | 546 |
| East Central | 135 | 115 | 115 | 110 | 123 | 120 | 105 | 104 | 120 | 128 |
| Capital | 1,364 | 1,430 | 1,363 | 1,371 | 1,395 | 1,408 | 1,359 | 1,360 | 1,407 | 1,673 |
| Aspen | 400 | 378 | 369 | 367 | 387 | 373 | 361 | 338 | 391 | 388 |
| Peace Country | 266 | 278 | 262 | 337 | 300 | 316 | 322 | 297 | 355 | 338 |
| Northern Lights | 147 | 164 | 201 | 212 | 212 | 195 | 213 | 197 | 228 | 253 |
| Alberta | 4,633 | 4,764 | 4,713 | 4,796 | 4,773 | 4,834 | 4,684 | 4,657 | 4,983 | 5,321 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 14.4 | 13.7 | 16.3 | 13.7 | 14.5 | 13.5 | 12.9 | 13.2 | 12.7 | 12.6 |
| Palliser | 11.4 | 12.2 | 14.0 | 13.2 | 14.1 | 12.7 | 12.0 | 11.9 | 13.9 | 11.5 |
| Calgary | 10.7 | 11.2 | 10.9 | 10.8 | 10.2 | 10.3 | 9.4 | 9.3 | 9.1 | 8.5 |
| David Thompson | 14.2 | 14.0 | 14.0 | 15.9 | 14.1 | 13.1 | 13.9 | 12.6 | 12.4 | 12.2 |
| East Central | 13.6 | 12.0 | 12.7 | 12.5 | 12.7 | 13.4 | 11.0 | 11.2 | 12.1 | 12.3 |
| Capital | 12.2 | 12.6 | 12.6 | 12.4 | 12.4 | 12.0 | 11.4 | 11.2 | 10.7 | 11.6 |
| Aspen | 15.4 | 14.9 | 16.1 | 15.3 | 16.1 | 15.6 | 15.1 | 14.2 | 15.1 | 14.3 |
| Peace Country | 13.9 | 14.3 | 14.4 | 17.7 | 15.6 | 15.5 | 16.4 | 14.3 | 15.4 | 14.2 |
| Northern Lights | 13.4 | 15.3 | 18.0 | 17.8 | 16.3 | 15.1 | 15.8 | 14.2 | 15.7 | 15.5 |
| Alberta | 12.3 | 12.6 | 12.9 | 12.9 | 12.5 | 12.1 | 11.6 | 11.2 | 11.2 | 11.0 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.4.6 Very High Birth Weight Births[1] and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Very High birth weight live births** | 644 | 767 | 778 | 797 | 743 | 782 | 697 | 683 | 734 | 881 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 1.7 | 2.0 | 2.1 | 2.1 | 1.9 | 2.0 | 1.7 | 1.6 | 1.6 | 1.8 |
| **Standard Error (SE)** | 0.07 | 0.07 | 0.08 | 0.08 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 |

Table 4.3.4.7 Very High Birth Weight Births[1] and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Very High birth weight live births** | 149 | 441 | 698 | 651 | 294 | 62 | 2,295 |
| **Live births** | 6,930 | 25,713 | 42,562 | 38,866 | 17,216 | 3,302 | 134,594 |
| **Rate (per 100 live births)** | 2.2 | 1.7 | 1.6 | 1.7 | 1.7 | 1.9 | 1.7 |
| **Standard Error (SE)** | 0.17 | 0.08 | 0.06 | 0.07 | 0.10 | 0.24 | 0.04 |

Table 4.3.4.8 Very High Birth Weight Births[1] and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Very High birth weight live births** | 144 | 87 | 578 | 285 | 43 | 657 | 238 | 148 | 115 | 2,295 |
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,594 |
| **Rate (per 100 live births)** | 2.1 | 2.0 | 1.2 | 2.3 | 1.5 | 1.7 | 3.1 | 2.2 | 2.6 | 1.7 |
| **Standard Error (SE)** | 0.18 | 0.22 | 0.05 | 0.13 | 0.22 | 0.06 | 0.20 | 0.18 | 0.24 | 0.04 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** 1. Very high birth weight births are those over 4,499 grams.
Data include Alberta residents only.
Totals for age groups and RHAs include unknown ages or RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.3.4.9 Very High Birth Weight Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

| Very high birth weight live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 32 | 43 | 32 | 32 | 34 | 37 | 39 | 51 | 47 | 51 |
| 20-24 | 112 | 131 | 128 | 144 | 138 | 143 | 114 | 123 | 142 | 176 |
| 25-29 | 202 | 245 | 243 | 255 | 237 | 236 | 210 | 200 | 231 | 267 |
| 30-34 | 194 | 222 | 244 | 250 | 219 | 250 | 225 | 203 | 201 | 247 |
| 35-39 | 86 | 104 | 112 | 99 | 96 | 90 | 92 | 82 | 94 | 118 |
| >39 | 16 | 21 | 19 | 16 | 17 | 24 | 17 | 22 | 18 | 22 |
| All | 642 | 766 | 778 | 796 | 741 | 780 | 697 | 681 | 733 | 881 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 1.2 | 1.7 | 1.3 | 1.4 | 1.5 | 1.7 | 1.9 | 2.4 | 2.0 | 2.1 |
| 20-24 | 1.5 | 1.7 | 1.7 | 1.9 | 1.8 | 1.8 | 1.5 | 1.5 | 1.6 | 1.9 |
| 25-29 | 1.7 | 2.1 | 2.2 | 2.2 | 2.0 | 1.9 | 1.7 | 1.5 | 1.6 | 1.7 |
| 30-34 | 1.9 | 2.2 | 2.4 | 2.4 | 2.0 | 2.2 | 1.9 | 1.7 | 1.6 | 1.8 |
| 35-39 | 2.0 | 2.3 | 2.4 | 2.1 | 2.0 | 1.8 | 1.9 | 1.6 | 1.6 | 1.9 |
| >39 | 2.4 | 2.7 | 2.4 | 2.0 | 2.1 | 2.4 | 1.7 | 2.1 | 1.7 | 1.9 |
| All | 1.7 | 2.0 | 2.1 | 2.1 | 1.9 | 2.0 | 1.7 | 1.6 | 1.6 | 1.8 |

Table 4.3.4.10 Very High Birth Weight Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

| Very high birth weight live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 45 | 48 | 43 | 50 | 44 | 51 | 39 | 44 | 52 | 48 |
| Palliser | 28 | 25 | 35 | 29 | 28 | 16 | 22 | 22 | 33 | 32 |
| Calgary | 171 | 212 | 222 | 223 | 188 | 221 | 187 | 183 | 170 | 225 |
| David Thompson | 70 | 78 | 70 | 104 | 88 | 87 | 92 | 73 | 105 | 107 |
| East Central | 20 | 22 | 16 | 15 | 17 | 20 | 20 | 13 | 13 | 17 |
| Capital | 184 | 230 | 243 | 213 | 226 | 218 | 184 | 192 | 197 | 268 |
| Aspen | 59 | 73 | 70 | 61 | 68 | 66 | 62 | 81 | 65 | 92 |
| Peace Country | 38 | 54 | 45 | 67 | 46 | 67 | 63 | 41 | 62 | 45 |
| Northern Lights | 27 | 24 | 34 | 34 | 35 | 34 | 28 | 32 | 36 | 47 |
| Alberta | 642 | 766 | 778 | 796 | 741 | 780 | 697 | 681 | 733 | 881 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 2.2 | 2.3 | 2.2 | 2.6 | 2.2 | 2.4 | 1.9 | 2.1 | 2.3 | 2.0 |
| Palliser | 2.3 | 2.0 | 2.9 | 2.4 | 2.3 | 1.3 | 1.7 | 1.6 | 2.4 | 2.0 |
| Calgary | 1.3 | 1.6 | 1.7 | 1.7 | 1.4 | 1.5 | 1.3 | 1.2 | 1.0 | 1.3 |
| David Thompson | 2.0 | 2.1 | 2.0 | 3.0 | 2.4 | 2.3 | 2.4 | 1.9 | 2.5 | 2.4 |
| East Central | 2.0 | 2.3 | 1.8 | 1.7 | 1.8 | 2.2 | 2.1 | 1.4 | 1.3 | 1.6 |
| Capital | 1.6 | 2.0 | 2.3 | 1.9 | 2.0 | 1.9 | 1.5 | 1.6 | 1.5 | 1.9 |
| Aspen | 2.3 | 2.9 | 3.1 | 2.5 | 2.8 | 2.8 | 2.6 | 3.4 | 2.5 | 3.4 |
| Peace Country | 2.0 | 2.8 | 2.5 | 3.5 | 2.4 | 3.3 | 3.2 | 2.0 | 2.7 | 1.9 |
| Northern Lights | 2.5 | 2.2 | 3.0 | 2.9 | 2.7 | 2.6 | 2.1 | 2.3 | 2.5 | 2.9 |
| Alberta | 1.7 | 2.0 | 2.1 | 2.1 | 1.9 | 2.0 | 1.7 | 1.6 | 1.6 | 1.8 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** 1. Very high birth weight births are those over 4,499 grams.

Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

# 4. Births

## 4.4 Preterm Births

# 4.4.1 Preterm Births

Preterm births *occur prior to 37 completed weeks of gestation* (Dorland, 2000). Gestation is measured in complete weeks from the date of the last menstrual period. Ultrasound is typically used to determine gestational age and is generally more accurate than other methods.

Preterm birth rate: *Number of preterm births per 100 live births in a given year.*

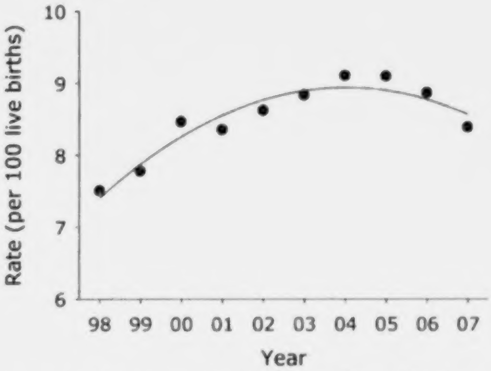
In 2005 dollars, direct medical costs alone of singleton preterm births have been estimated at $20 million per year in Alberta. Preterm births account for more than 80% of complications and mortality around the time of birth (Institute of Health Economics, et al., 2007; note that the cost estimate excluded indirect, social, and other costs, and only included a portion of direct medical costs).

For babies that are very preterm, outcomes include respiratory problems, motor and sensory complications (e.g., cerebral palsy, visual system disorders, hearing disorders), and neurocognitive problems (e.g., lower IQ, lower academic achievement, behaviour issues; Institute of Health Economics, et al., 2007). Medical advances have resulted in higher survival rates, at the cost of increased severe morbidity rates (Wen, Smith, Yang, and Walker, 2004). Even babies born close to term have been shown to have deficits in reading and spelling (Kirkegaard, Obel, Hedegaard, and Henriksen, 2006).

## Time Trends (see Tables 4.4.1.1, 4.4.1.2, 4.4.1.3, 4.4.1.6)

- Over 90% of live births in Alberta are term births (37 to 42 weeks gestation), and almost none are post-term (more than 42 weeks gestation). The remaining births are preterm (less than 37 weeks gestation).
- More than 90% of the preterm births occur between 27 and 36 weeks gestation, and the vast majority occurs at 35 or 36 weeks gestation.

Preterm Birth Rate, Alberta, 1998 to 2007



- The preterm birth rate increased from 1998 to 2004, and declined in 2006 and 2007. The rate was 8.4 (per 100 live births) in 2007; this represents 4,054 preterm live births, compared to 2,815 preterm live births in 1998.
- Among low birth weight births, 72.5% were preterm, while just 3.8% of non-low birth weight births were preterm in 2007.
- Multiple live births occurred prior to term 56.2% of the time in 2007, compared to a preterm rate of 6.8% for singleton births.

# 4.4.1 Preterm Births

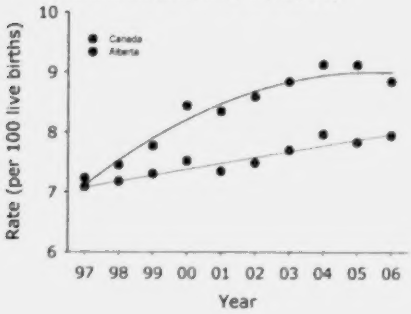
Risk factors for preterm birth include maternal smoking, genital tract infection, preeclampsia, incompetent cervix, prior preterm birth, placental abruption, high maternal age, assisted reproduction, multiple pregnancy, low socioeconomic status, substance abuse, and psychological factors such as stress and depression (e.g., Slattery and Morrison, 2002; Tough et al., 2003).

Rising preterm birth rates are partially due to increases in rates of assisted and multiple pregnancy, accuracy of estimations of gestational age, and rates of registration of extremely preterm or extremely low birth weight infants, as well as changes in maternal risk factor patterns (Wen, Smith, Yang, and Walker, 2004).

The preterm birth rate was similar in Canada and Alberta in the late 1990s. The rate increased to 2004 in both Canada and Alberta, but the increase was greater in Alberta. By 2006, the preterm birth rate was 8.8 (per 100 live births) in Alberta and 7.9 in Canada (Statistics Canada, 2008c).

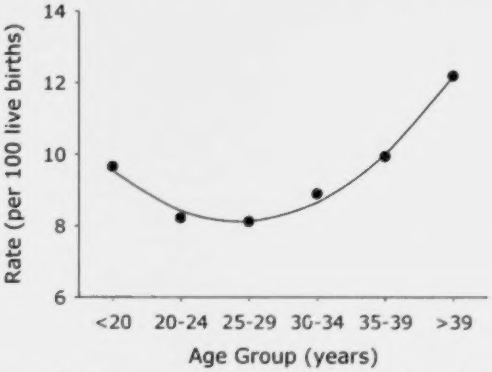
Preterm Birth Rate,
Alberta and Canada, 1997 to 2006

Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)



## Age Effects (see Tables 4.4.1.4, 4.4.1.7)

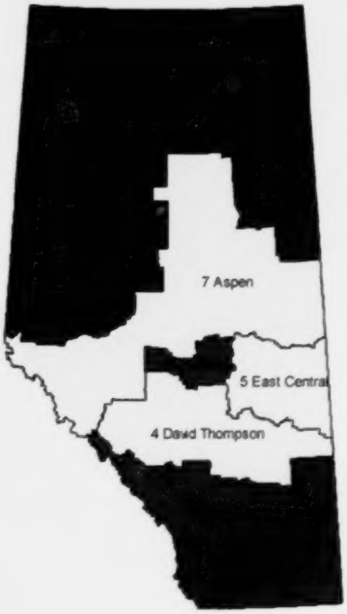
Preterm Birth Rate by Maternal Age
Group, Alberta, 2005 to 2007 Combined



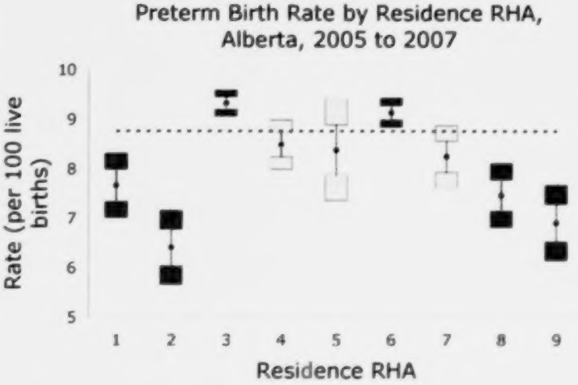
- Preterm births were most common in mothers 35 and older, especially mothers older than 39 years of age, between 2005 and 2007. The lowest rates occurred in women between 20 and 29 years of age.
- For 2005 to 2007 combined, the preterm birth rate was 12.2 (per 100 live births) for mothers over 39 years of age, and 8.1 for mothers 25 to 29 years of age.

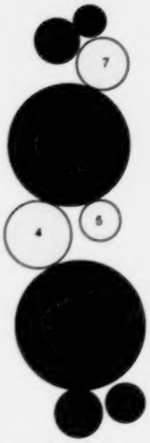
## 4.4.1 Preterm Births

Preterm Birth Rate, 2005-07 Combined



### Regional Data (see Tables 4.4.1.5, 4.4.1.8)





- Between 2005 and 2007, preterm birth rates were lower than the provincial average in RHAs 1, 2, 8, and 9. The lowest rate was 6.4 (per 100 live births) in RHA 2.
- The preterm birth rate was higher than the provincial average in the two major metropolitan areas (RHAs 3 and 6) during that time period. The highest rate was 9.3, in RHA 3.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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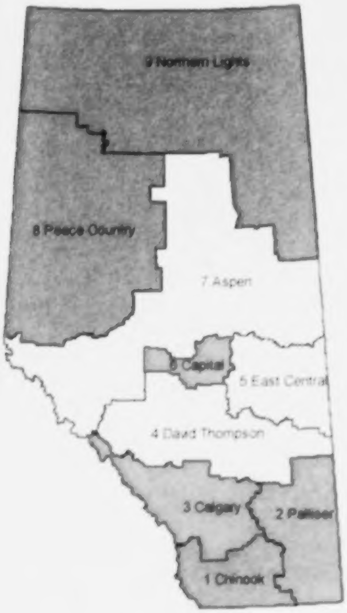
### Limitations and Methodology Notes

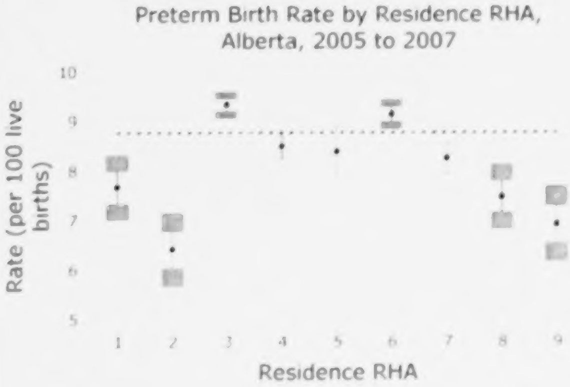
See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

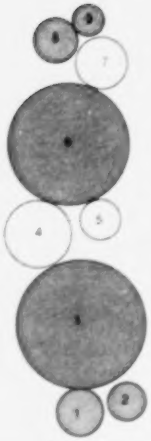
# 4.4.1 Preterm Births

Preterm Birth Rate, 2005-07 Combined


9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Regional Data (see Tables 4.4.1.5, 4.4.1.8)





- Between 2005 and 2007, preterm birth rates were lower than the provincial average in RHAs 1, 2, 8, and 9. The lowest rate was 6.4 (per 100 live births) in RHA 2.
- The preterm birth rate was higher than the provincial average in the two major metropolitan areas (RHAs 3 and 6) during that time period. The highest rate was 9.3, in RHA 3.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.4.1.1 Preterm Births and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preterm live births** | 2,815 | 2,936 | 3,098 | 3,108 | 3,300 | 3,521 | 3,666 | 3,781 | 3,957 | 4,054 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 7.5 | 7.8 | 8.5 | 8.3 | 8.6 | 8.8 | 9.1 | 9.1 | 8.9 | 8.4 |
| **Standard Error (SE)** | 0.14 | 0.14 | 0.15 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.13 | 0.13 |

Table 4.4.1.2 Preterm Births and Rate by Low Birth Weight Status, Alberta, 1998 to 2007

| Birth weight <2500 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preterm low birth weight live births** | 1,578 | 1,605 | 1,619 | 1,632 | 1,778 | 1,896 | 1,929 | 2,032 | 2,269 | 2,331 |
| **Low birth weight live births** | 2,328 | 2,243 | 2,250 | 2,265 | 2,486 | 2,517 | 2,589 | 2,728 | 3,109 | 3,213 |
| **Rate (per 100 low birth weight live births)** | 67.8 | 71.6 | 72.0 | 72.1 | 71.5 | 75.3 | 74.5 | 74.5 | 73.0 | 72.5 |
| **Standard Error (SE)** | 0.97 | 0.95 | 0.95 | 0.94 | 0.91 | 0.86 | 0.86 | 0.83 | 0.80 | 0.79 |

| Birth weight >2499 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preterm non-low birth weight live births** | 1,237 | 1,331 | 1,478 | 1,476 | 1,522 | 1,625 | 1,737 | 1,749 | 1,688 | 1,723 |
| **Non-low birth weight live births** | 35,199 | 35,535 | 34,374 | 34,959 | 35,807 | 37,351 | 37,703 | 38,859 | 41,550 | 45,134 |
| **Rate (per 100 non-low birth weight live births)** | 3.5 | 3.7 | 4.3 | 4.2 | 4.3 | 4.4 | 4.6 | 4.5 | 4.1 | 3.8 |
| **Standard Error (SE)** | 0.10 | 0.10 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.10 | 0.09 |

Table 4.4.1.3 Preterm Births and Rate by Plurality, Alberta, 1998 to 2007

| Multiple | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preterm multiple live births** | 534 | 543 | 611 | 620 | 694 | 809 | 812 | 728 | 835 | 884 |
| **Multiple live births** | 1,002 | 1,029 | 1,098 | 1,140 | 1,221 | 1,294 | 1,359 | 1,338 | 1,442 | 1,574 |
| **Rate (per 100 multiple live births)** | 53.3 | 52.8 | 55.6 | 54.4 | 56.8 | 62.5 | 59.7 | 54.4 | 57.9 | 56.2 |
| **Standard Error (SE)** | 1.58 | 1.56 | 1.50 | 1.48 | 1.42 | 1.35 | 1.33 | 1.36 | 1.30 | 1.25 |

| Singleton | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preterm singleton live births** | 2,281 | 2,393 | 2,487 | 2,488 | 2,606 | 2,712 | 2,854 | 3,053 | 3,122 | 3,170 |
| **Singleton live births** | 36,527 | 36,749 | 35,527 | 36,086 | 37,072 | 38,574 | 38,933 | 40,249 | 43,217 | 46,774 |
| **Rate (per 100 singleton live births)** | 6.2 | 6.5 | 7.0 | 6.9 | 7.0 | 7.0 | 7.3 | 7.6 | 7.2 | 6.8 |
| **Standard Error (SE)** | 0.13 | 0.13 | 0.14 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.12 | 0.12 |

Table 4.4.1.4 Preterm Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Preterm live births** | 668 | 2,110 | 3,450 | 3,452 | 1,709 | 402 | 11,792 |
| **Live births** | 6,930 | 25,713 | 42,562 | 38,866 | 17,216 | 3,302 | 134,591 |
| **Rate (per 100 live births)** | 9.6 | 8.2 | 8.1 | 8.9 | 9.9 | 12.2 | 8.8 |
| **Standard Error (SE)** | 0.35 | 0.17 | 0.13 | 0.14 | 0.23 | 0.57 | 0.08 |

Table 4.4.1.5 Preterm Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Preterm live births** | 519 | 275 | 4,617 | 1,066 | 248 | 3,621 | 633 | 504 | 309 | 11,793 |
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,601 |
| **Rate (per 100 live births)** | 7.7 | 6.4 | 9.3 | 8.5 | 8.4 | 9.1 | 8.2 | 7.5 | 6.9 | 8.8 |
| **Standard Error (SE)** | 0.32 | 0.37 | 0.13 | 0.25 | 0.51 | 0.14 | 0.31 | 0.32 | 0.38 | 0.08 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.4.1.6 Live Births by Gestational Age Categories, Alberta, 1998 to 2007

| 20 - 27 weeks | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births 20 to 27 weeks** | 162 | 173 | 207 | 180 | 221 | 216 | 224 | 269 | 236 | 243 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 0.43 | 0.46 | 0.57 | 0.48 | 0.58 | 0.54 | 0.56 | 0.65 | 0.53 | 0.50 |
| **Standard Error (SE)** | 0.03 | 0.03 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 |

| 28 - 36 weeks | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births 28 to 36 weeks** | 2,649 | 2,757 | 2,886 | 2,921 | 3,067 | 3,298 | 3,431 | 3,502 | 3,710 | 3,799 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 7.1 | 7.3 | 7.9 | 7.8 | 8.0 | 8.3 | 8.5 | 8.4 | 8.3 | 7.9 |
| **Standard Error (SE)** | 0.13 | 0.13 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.13 | 0.12 |

| 37 - 42 weeks (term) | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births 37 to 41 weeks** | 34,689 | 34,817 | 33,496 | 34,097 | 34,978 | 36,328 | 36,612 | 37,787 | 40,695 | 44,287 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 92.4 | 92.2 | 91.5 | 91.6 | 91.3 | 91.1 | 90.9 | 90.9 | 91.1 | 91.6 |
| **Standard Error (SE)** | 0.14 | 0.14 | 0.15 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.13 | 0.13 |

| 43 weeks or more (post-term) | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births 42 weeks or more** | 24 | 21 | 29 | 15 | 15 | 19 | 13 | 19 | 7 | 7 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Standard Error (SE)** | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release

**Notes:** Data include Alberta residents only

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.4.1.7 Preterm Live Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

| Preterm live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 241 | 193 | 215 | 193 | 204 | 193 | 188 | 222 | 228 | 218 |
| 20-24 | 545 | 614 | 576 | 616 | 713 | 702 | 713 | 656 | 753 | 701 |
| 25-29 | 801 | 832 | 870 | 892 | 937 | 1,018 | 1,063 | 1,151 | 1,108 | 1,191 |
| 30-34 | 755 | 821 | 865 | 838 | 934 | 1,000 | 1,009 | 1,072 | 1,188 | 1,192 |
| 35-39 | 410 | 398 | 474 | 475 | 432 | 494 | 554 | 547 | 558 | 604 |
| >39 | 61 | 77 | 98 | 94 | 80 | 114 | 138 | 132 | 122 | 148 |
| All | 2,815 | 2,936 | 3,098 | 3,108 | 3,300 | 3,521 | 3,666 | 3,781 | 3,957 | 4,054 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 9.2 | 7.4 | 8.8 | 8.3 | 9.2 | 9.1 | 9.0 | 10.3 | 9.9 | 8.8 |
| 20-24 | 7.1 | 7.8 | 7.7 | 8.2 | 9.2 | 8.7 | 9.1 | 8.2 | 8.7 | 7.7 |
| 25-29 | 6.8 | 7.1 | 7.7 | 7.8 | 7.9 | 8.3 | 8.4 | 8.8 | 7.9 | 7.7 |
| 30-34 | 7.2 | 8.0 | 8.6 | 8.0 | 8.6 | 8.7 | 8.6 | 8.9 | 9.2 | 8.6 |
| 35-39 | 9.5 | 8.6 | 10.3 | 10.3 | 9.1 | 10.0 | 11.2 | 10.4 | 9.8 | 9.6 |
| >39 | 9.1 | 10.0 | 12.5 | 11.6 | 9.7 | 11.4 | 14.0 | 12.6 | 11.4 | 12.5 |
| All | 7.5 | 7.8 | 8.5 | 8.3 | 8.6 | 8.8 | 9.1 | 9.1 | 8.9 | 8.4 |

Table 4.4.1.8 Preterm Live Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

| Preterm live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 130 | 143 | 149 | 142 | 135 | 161 | 169 | 147 | 196 | 176 |
| Palliser | 98 | 77 | 79 | 88 | 93 | 105 | 68 | 85 | 88 | 102 |
| Calgary | 994 | 1,045 | 1,131 | 1,126 | 1,243 | 1,349 | 1,383 | 1,509 | 1,511 | 1,597 |
| David Thompson | 229 | 257 | 257 | 278 | 299 | 279 | 319 | 350 | 359 | 357 |
| East Central | 70 | 59 | 84 | 82 | 64 | 99 | 86 | 90 | 92 | 66 |
| Capital | 920 | 952 | 1,019 | 986 | 1,024 | 1,095 | 1,177 | 1,179 | 1,202 | 1,240 |
| Aspen | 176 | 199 | 187 | 192 | 207 | 192 | 232 | 193 | 221 | 219 |
| Peace Country | 116 | 121 | 112 | 141 | 124 | 144 | 149 | 137 | 184 | 183 |
| Northern Lights | 81 | 83 | 80 | 73 | 90 | 97 | 82 | 91 | 104 | 114 |
| Alberta | 2,815 | 2,936 | 3,098 | 3,108 | 3,300 | 3,521 | 3,666 | 3,781 | 3,957 | 4,054 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 6.4 | 6.9 | 7.7 | 7.2 | 6.9 | 7.7 | 8.3 | 7.0 | 8.7 | 7.3 |
| Palliser | 7.9 | 6.3 | 6.5 | 7.2 | 7.6 | 8.3 | 5.3 | 6.3 | 6.5 | 6.5 |
| Calgary | 7.7 | 8.0 | 8.7 | 8.6 | 9.1 | 9.3 | 9.5 | 9.8 | 9.2 | 9.0 |
| David Thompson | 6.4 | 7.0 | 7.4 | 8.0 | 8.3 | 7.5 | 8.4 | 9.2 | 8.4 | 8.0 |
| East Central | 7.0 | 6.1 | 9.3 | 9.3 | 8.7 | 11.0 | 9.0 | 9.7 | 9.3 | 6.3 |
| Capital | 8.2 | 8.4 | 9.4 | 8.9 | 9.1 | 9.4 | 9.9 | 9.7 | 9.2 | 8.6 |
| Aspen | 6.8 | 7.8 | 8.2 | 8.0 | 8.6 | 8.0 | 9.7 | 8.1 | 8.6 | 8.1 |
| Peace Country | 6.0 | 6.2 | 6.2 | 7.4 | 6.5 | 7.1 | 7.6 | 6.6 | 8.0 | 7.7 |
| Northern Lights | 7.4 | 7.8 | 7.2 | 6.1 | 6.9 | 7.5 | 6.1 | 6.6 | 7.2 | 7.0 |
| Alberta | 7.5 | 7.8 | 8.5 | 8.3 | 8.6 | 8.8 | 9.1 | 9.1 | 8.9 | 8.4 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

# 4. Births

## 4.5 Multiple Births

# 4.5.1 Multiple Births

Multiple pregnancy: *Pregnancy in which two or more fetuses exist simultaneously* (Dorland, 2000).

Multiple birth: *The birth of two or more offspring produced in the same gestation period* (Dorland, 2000). This includes both live births and stillbirths.

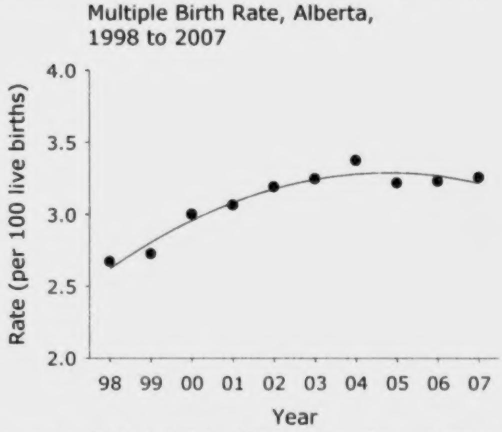
Multiple birth rate: *Number of multiple live births per 100 live births.*

Risk factors for multiple pregnancy include ovulation-stimulating medications, assisted reproductive technologies, higher maternal age, and obesity (Reddy, Branum, and Klebanoff, 2005).

Adverse perinatal outcomes more common in twins than singletons include preterm birth, low birth weight, in utero growth restriction, stillbirth, congenital anomalies, twin-twin transfusion syndrome, and infant death. Twins conceived after in vitro fertilization have worse perinatal outcomes than twins conceived spontaneously. Triplets and higher order multiples are at greatly increased risk of complications, compared to twins and singletons (Bissonnette, Cohen, Collins, et al., 2007).

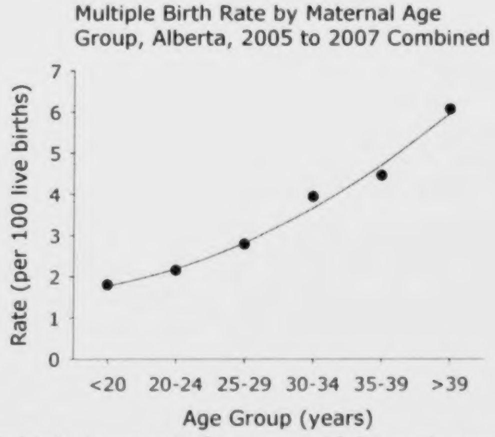
Multiple gestations are associated with maternal complications as well, including including maternal cardiovascular morbidity, haematologic morbidity, amniotic fluid embolus, pre-eclampsia, gestational diabetes, postpartum hemorrhage, prolonged hospital stay, operative delivery, hysterectomy, and blood transfusion. Rates of uterine rupture and vaginal tearing are lower in multiple pregnancies, owing to the high rates of cesarean section in multiple births (Walker, Murphy, Pan, Yang, and Wen, 2004).

## Time Trends (see Tables 4.5.1.1, 4.5.1.4, 4.5.1.5, 4.5.1.6)



- The rate of multiple birth in Alberta rose from 1998 to 2004, and stabilized thereafter. In 2007, there were 1,574 multiple live births, for a rate of 3.3 (per 100 live births).
- In 2007, 96.8% of multiple births were twin births. There were 37 live births that were triplets, and no quadruplet births.
- For 2005 to 2007 combined, 52.7% of multiple births were low birth weight, compared with 5.2% of singleton births.
- Singleton births were at term 92.8% of the time between 2005 and 2007, compared with 43.8% of multiple births.

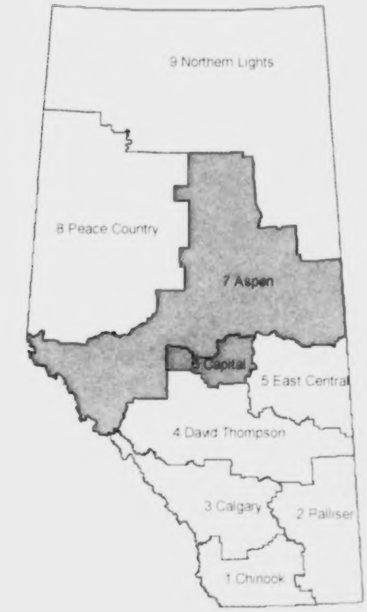
## Maternal Age Effects (see Tables 4.5.1.2, 4.5.1.7)



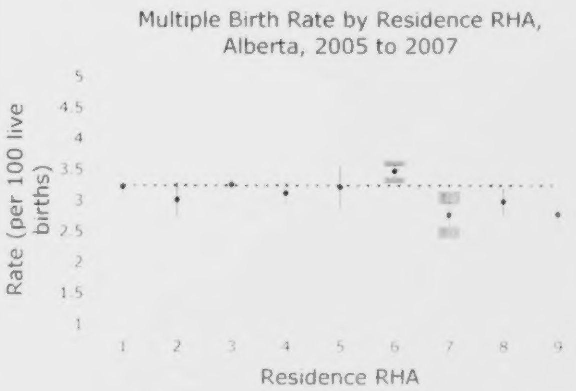
- Multiple births increase in frequency with increasing maternal age.
- The multiple birth rate was 1.8 (per 100 live births) for women under 20 years of age and 6.1 for mothers over 39 years of age (more than three times as high).

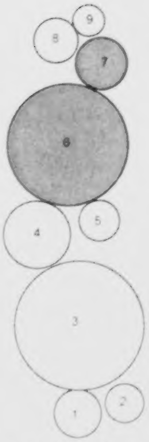
# 4.5.1 Multiple Births

Multiple Birth Rate, 2005-07 Combined


9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Regional Data (see Tablse 4.5.1.3, 4.5.1.8)





- For 2005 to 2007 combined, the multiple birth rate was lower than the provincial average in RHA 7 (2.8 per 100 live births).
- The rate was higher than the provincial average in RHA 6 (3.5 per 100 live births) during this time period.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

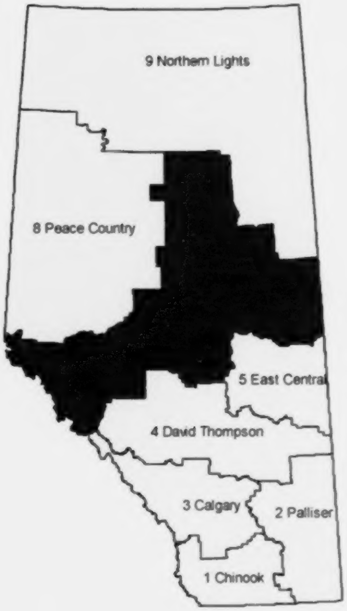
### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

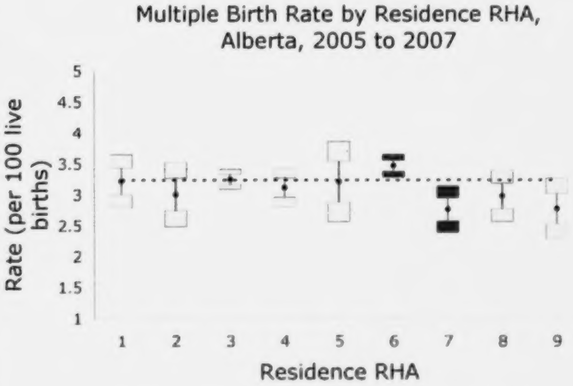
# 4.5.1 Multiple Births

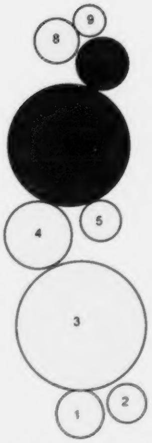
Long-term disabilities known to occur in multiples are generally associated with preterm birth and include cerebral palsy, chronic lung disease, visual impairments, and learning disabilities (Bissonnette, Cohen, Collins, et al., 2007).

Multiple Birth Rate, 2005-07 Combined


9 Northern Lights
8 Peace Country
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Regional Data (see Tablse 4.5.1.3, 4.5.1.8)





- For 2005 to 2007 combined, the muliple birth rate was lower than the provincial average in RHA 7 (2.8 per 100 live births).
- The rate was higher than the provincial average in RHA 6 (3.5 per 100 live births) during this time period.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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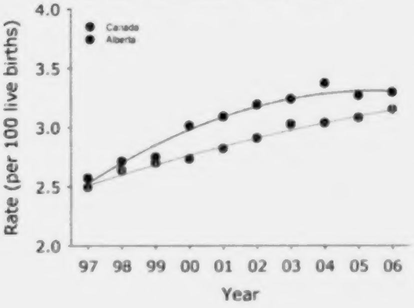
### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

## 4.5.1 Multiple Births

Prior to 2000, Canada and Alberta had very similar rates of multiple births. From 2000 to 2004, the Albertan rate increased at a faster pace than the Canadian rate. By 2005, however, the two rates were not statistically different. The multiple birth rate in 2006 was 3.1 in Canada and 3.3 in Alberta (Statistics Canada, 2008c).



Multiple Birth Rate,
Alberta and Canada, 1997 to 2006

Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)

Table 4.5.1.1 Multiple Births and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Multiple live births** | 1,002 | 1,029 | 1,098 | 1,140 | 1,221 | 1,294 | 1,359 | 1,338 | 1,442 | 1,574 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 2.7 | 2.7 | 3.0 | 3.1 | 3.2 | 3.2 | 3.4 | 3.2 | 3.2 | 3.3 |
| **Standard Error (SE)** | 0.08 | 0.08 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.08 | 0.08 |

Table 4.5.1.2 Multiple Births and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Multiple live births** | 124 | 552 | 1,182 | 1,528 | 766 | 200 | 4,352 |
| **Live births** | 6,930 | 25,713 | 42,562 | 38,866 | 17,216 | 3,302 | 134,591 |
| **Rate (per 100 live births)** | 1.8 | 2.1 | 2.8 | 3.9 | 4.4 | 6.1 | 3.2 |
| **Standard Error (SE)** | 0.16 | 0.09 | 0.08 | 0.10 | 0.16 | 0.42 | 0.05 |

Table 4.5.1.3 Multiple Births and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Multiple live births** | 218 | 129 | 1,609 | 391 | 95 | 1,375 | 212 | 201 | 124 | 4,354 |
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,601 |
| **Rate (per 100 live births)** | 3.2 | 3.0 | 3.3 | 3.1 | 3.2 | 3.5 | 2.8 | 3.0 | 2.8 | 3.2 |
| **Standard Error (SE)** | 0.21 | 0.26 | 0.08 | 0.16 | 0.32 | 0.09 | 0.19 | 0.21 | 0.25 | 0.05 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.5.1.4 Twin, Triplet and Quadruplet Live Births and Percent of Live Births, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live twins** | 965 | 997 | 1,053 | 1,092 | 1,188 | 1,237 | 1,304 | 1,298 | 1,416 | 1,537 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 2.6 | 2.6 | 2.9 | 2.9 | 3.1 | 3.1 | 3.2 | 3.1 | 3.2 | 3.2 |
| **Standard Error (SE)** | 0.08 | 0.08 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.09 | 0.08 | 0.08 |

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live triplets** | 34 | 32 | 45 | 43 | 29 | 57 | 52 | 40 | 26 | 37 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| **Standard Error (SE)** | 0.02 | 0.01 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 |

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live quadruplets** | 3 | 0 | 0 | 5 | 4 | 0 | 3 | 0 | 0 | 0 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 100 live births)** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Standard Error (SE)** | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.5.1.5 Live Births and Percent of Births by Plurality and Birth Weight Category (grams), Alberta, 2005 to 2007 Combined

| | <500 | 500-749 | 750-999 | 1000-1249 | 1250-1499 | 1500-2499 | 2500-4499 | >4499 | Total | Average (grams) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births** | 214 | 270 | 307 | 326 | 479 | 7,455 | 123,248 | 2,295 | 134,594 | 3,348 |
| **Multiple live births** | 39 | 51 | 70 | 79 | 145 | 1,910 | 2,060 | 0 | 4,354 | 2,378 |
| **% of multiple live births** | 0.9 | 1.2 | 1.6 | 1.8 | 3.3 | 43.9 | 47.3 | 0.0 | 100.0 | - |
| **Singleton live births** | 175 | 219 | 237 | 247 | 334 | 5,545 | 121,188 | 2,295 | 130,240 | 3,380 |
| **% of singleton live births** | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 4.3 | 93.0 | 1.8 | 100.0 | - |

Table 4.5.1.6 Live Births and Percent of Births by Plurality and Gestational Age Category (weeks), Alberta, 2005 to 2007 Combined

| | 20-27 | 28-36 | 37-42 | >42 | Total | Average (weeks) |
|---|---|---|---|---|---|---|
| **Live births** | 748 | 11,011 | 122,769 | 33 | 134,594 | 38.8 |
| **Multiple live births** | 141 | 2,301 | 1,907 | 0 | 4,354 | 35.3 |
| **% of multiple live births** | 3.2 | 52.8 | 43.8 | 0.0 | 100.0 | - |
| **Singleton live births** | 607 | 8,710 | 120,862 | 33 | 130,240 | 38.9 |
| **% of singleton live births** | 0.5 | 6.7 | 92.8 | 0.0 | 100.0 | - |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.5.1.7 Multiple Births and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

| Multiple live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 28 | 27 | 35 | 38 | 33 | 41 | 30 | 38 | 43 | 43 |
| 20-24 | 128 | 139 | 159 | 175 | 192 | 202 | 185 | 167 | 185 | 200 |
| 25-29 | 295 | 277 | 311 | 292 | 310 | 322 | 362 | 388 | 365 | 429 |
| 30-34 | 358 | 384 | 344 | 378 | 430 | 440 | 472 | 446 | 543 | 539 |
| 35-39 | 165 | 174 | 211 | 218 | 224 | 255 | 252 | 235 | 253 | 278 |
| >39 | 28 | 28 | 38 | 39 | 32 | 34 | 58 | 64 | 53 | 83 |
| All | 1,002 | 1,029 | 1,098 | 1,140 | 1,221 | 1,294 | 1,359 | 1,338 | 1,442 | 1,574 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 1.1 | 1.0 | 1.4 | 1.6 | 1.5 | 1.9 | 1.4 | 1.8 | 1.9 | 1.7 |
| 20-24 | 1.7 | 1.8 | 2.1 | 2.3 | 2.5 | 2.5 | 2.4 | 2.1 | 2.1 | 2.2 |
| 25-29 | 2.5 | 2.4 | 2.8 | 2.5 | 2.6 | 2.6 | 2.9 | 3.0 | 2.6 | 2.8 |
| 30-34 | 3.4 | 3.7 | 3.4 | 3.6 | 3.9 | 3.8 | 4.0 | 3.7 | 4.2 | 3.9 |
| 35-39 | 3.8 | 3.8 | 4.6 | 4.7 | 4.7 | 5.2 | 5.1 | 4.5 | 4.4 | 4.4 |
| >39 | 4.2 | 3.6 | 4.9 | 4.8 | 3.9 | 3.4 | 5.9 | 6.1 | 4.9 | 7.0 |
| All | 2.7 | 2.7 | 3.0 | 3.1 | 3.2 | 3.2 | 3.4 | 3.2 | 3.2 | 3.3 |

Table 4.5.1.8 Multiple Births and Rates by Year and Residence RHA, Alberta, 1998 to 2007

| Multiple live births | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 34 | 63 | 74 | 66 | 62 | 53 | 64 | 62 | 76 | 80 |
| Palliser | 26 | 36 | 46 | 42 | 41 | 39 | 44 | 47 | 32 | 50 |
| Calgary | 383 | 370 | 385 | 452 | 468 | 529 | 494 | 478 | 551 | 580 |
| David Thompson | 102 | 104 | 95 | 96 | 140 | 107 | 127 | 151 | 126 | 114 |
| East Central | 14 | 36 | 34 | 29 | 22 | 32 | 40 | 40 | 34 | 21 |
| Capital | 308 | 289 | 335 | 322 | 319 | 347 | 444 | 418 | 446 | 511 |
| Aspen | 55 | 59 | 60 | 67 | 60 | 87 | 68 | 58 | 85 | 69 |
| Peace Country | 53 | 53 | 34 | 46 | 61 | 61 | 54 | 58 | 60 | 83 |
| Northern Lights | 27 | 19 | 35 | 20 | 48 | 39 | 24 | 26 | 32 | 66 |
| Alberta | 1,002 | 1,029 | 1,098 | 1,140 | 1,221 | 1,294 | 1,359 | 1,338 | 1,442 | 1,574 |

| Rate (per 100 live births) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 1.7 | 3.1 | 3.8 | 3.4 | 3.1 | 2.5 | 3.1 | 2.9 | 3.4 | 3.3 |
| Palliser | 2.1 | 2.9 | 3.8 | 3.4 | 3.3 | 3.1 | 3.4 | 3.5 | 2.3 | 3.2 |
| Calgary | 3.0 | 2.8 | 2.9 | 3.4 | 3.4 | 3.7 | 3.4 | 3.1 | 3.4 | 3.3 |
| David Thompson | 2.9 | 2.9 | 2.7 | 2.8 | 3.9 | 2.9 | 3.4 | 3.9 | 3.0 | 2.5 |
| East Central | 1.4 | 3.7 | 3.7 | 3.3 | 2.3 | 3.6 | 4.2 | 4.3 | 3.4 | 2.0 |
| Capital | 2.8 | 2.6 | 3.1 | 2.9 | 2.8 | 3.0 | 3.7 | 3.5 | 3.4 | 3.5 |
| Aspen | 2.1 | 2.3 | 2.6 | 2.8 | 2.5 | 3.6 | 2.8 | 2.4 | 3.3 | 2.6 |
| Peace Country | 2.8 | 2.7 | 1.9 | 2.4 | 3.2 | 3.0 | 2.8 | 2.8 | 2.6 | 3.5 |
| Northern Lights | 2.5 | 1.8 | 3.1 | 1.7 | 3.7 | 3.0 | 1.8 | 1.9 | 2.2 | 4.0 |
| Alberta | 2.7 | 2.7 | 3.0 | 3.1 | 3.2 | 3.2 | 3.4 | 3.2 | 3.2 | 3.3 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.

Totals for age groups and RHAs include unknown ages or RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction.

# *4. Births*

## *4.6 Infant morbidity*

*4.6.1 Respiratory Distress Syndrome*
*4.6.2 Congenital Anomalies*

## 4.6.1 Respiratory Distress Syndrome

Respiratory distress syndrome: *Lung disorder that causes difficulty in breathing due to lack of surfactant in an infant's lungs.* Respiratory distress syndrome results in a life-threatening deficiency of blood oxygen (Morgan, 1990).

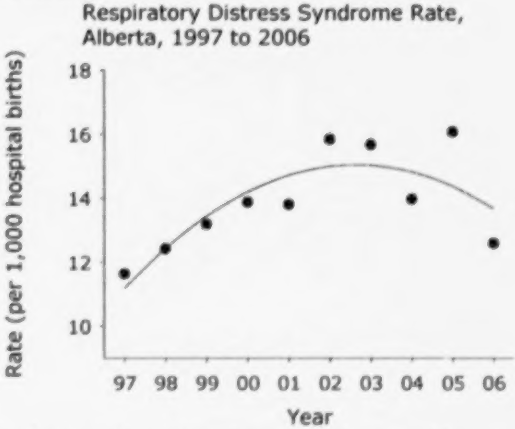
Respiratory distress syndrome rate: *Number of cases of respiratory distress syndrome per 1,000 hospital deliveries in a given year.*

Respiratory distress syndrome of the newborn results from a surfactant deficiency in the lungs, mainly in preterm babies born prior to approximately 36 weeks gestation but sometimes in term infants. Surfactant keeps the lungs from collapsing so adequate oxygen intake can occur (Public Health Agency of Canada, 2007).

Complications of respiratory distress syndrome include death, intraventricular bleeding and the development of chronic lung disease. Use of antenatal steroids and surfactant treatments has been successful in reducing mortality and morbidity (Public Health Agency of Canada, 2007).

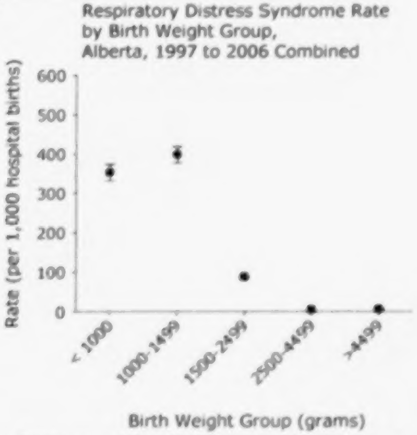
Subsequent to the development of antenatal steroid treatment, the rate of respiratory distress syndrome has declined markedly, but many infants still require assisted ventilation or surfactant treatment after birth. Assisted ventilation is one of the biggest costs in the care of preterm infants. Furthermore, respiratory distress syndrome is a leading cause of death among preterm infants (Public Health Agency of Canada, 2007).

### Time Trends (see Tables 4.6.1.1, 4.6.1.2)



- The respiratory distress syndrome rate increased between 1997 and 2000, and was variable from 2002 to 2006. In 2006, 556 babies were diagnosed with respiratory distress syndrome, for a rate of 12.6 (per 1,000 hospital deliveries).
- Respiratory distress syndrome is diagnosed in males more often than females. In 2006, the rate for males was 13.9, and the female rate was 11.2.

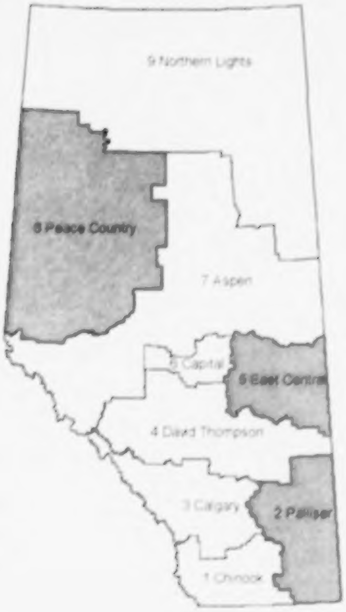
### Birth Weight Effects (see Tables 4.6.1.3)



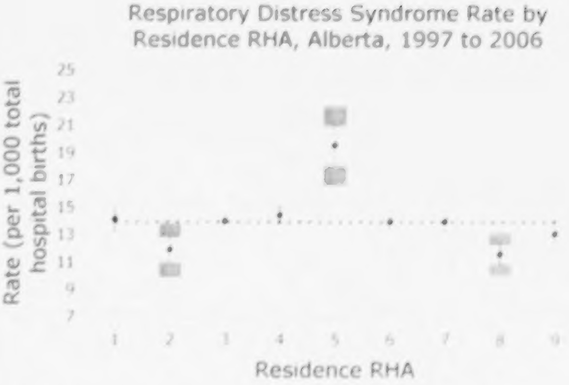
- For 1997 to 2006 combined, the rate of respiratory distress was much higher in babies with birth weights less than 1,500 grams than in heavier babies.
- The highest rate (398.1 per 1,000 hospital births) was in the 1,000 to 1,499 gram group, and the lowest rate (4.0) was in the 2,500 to 4,499 group between 1997 and 2006.

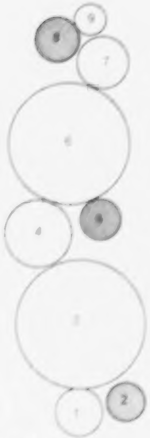
# 4.6.1 Respiratory Distress Syndrome

Respiratory Distress Syndrome Rate, 1997-2006 Combined


9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Regional Data (see Table 4.6.1.4)





- The respiratory distress syndrome rate was lower than the provincial average in RHAs 2 and 8 between 1997 and 2006. The lowest rate was in RHA 8 (11.6 per 1,000 hospital births).
- The rate was higher than the provincial average in RHA 5 (19.5 per 1,000 hospital births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

### Limitations and Methodology Notes

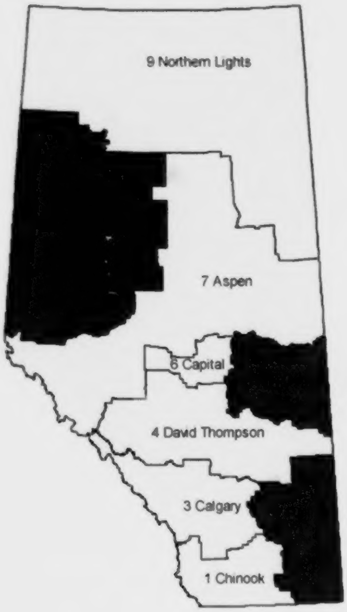
Detailed criteria for data extraction are provided in Appendix 6.1.1

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002 respiratory distress syndrome data to data from prior years due to changes in data coding systems

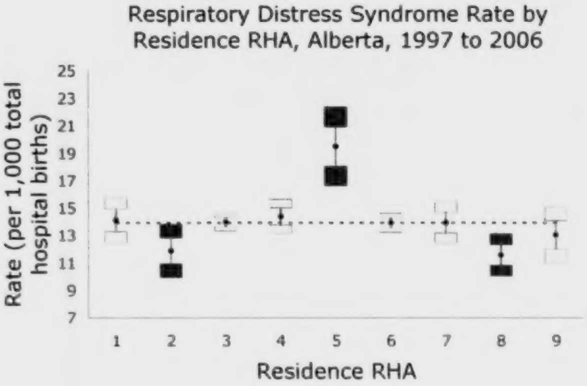
See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data

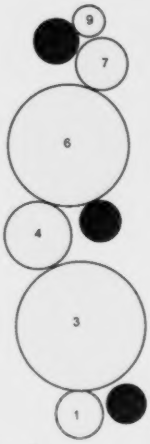
# 4.6.1 Respiratory Distress Syndrome

Respiratory Distress Syndrome Rate, 1997-2006 Combined



## Regional Data (see Table 4.6.1.4)





- The respiratory distress syndrome rate was lower than the provincial average in RHAs 2 and 8 between 1997 and 2006. The lowest rate was in RHA 8 (11.6 per 1,000 hospital births).
- The rate was higher than the provincial average in RHA 5 (19.5 per 1,000 hospital births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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## Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002 respiratory distress syndrome data to data from prior years due to changes in data coding systems.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.6.1.1 Respiratory Distress Cases and Rate by Year, Alberta, 1997 to 2006

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Respiratory distress cases** | 421 | 461 | 493 | 503 | 508 | 600 | 618 | 558 | 662 | 556 |
| **Live hospital births** | 36,217 | 37,158 | 37,402 | 36,272 | 36,833 | 37,898 | 39,453 | 39,960 | 41,192 | 44,190 |
| **Rate (per 1,000 hospital births)** | 11.6 | 12.4 | 13.2 | 13.9 | 13.8 | 15.8 | 15.7 | 14.0 | 16.1 | 12.6 |
| **Standard Error (SE)** | 0.56 | 0.57 | 0.59 | 0.61 | 0.61 | 0.64 | 0.63 | 0.59 | 0.62 | 0.53 |

Table 4.6.1.2 Respiratory Distress Cases and Rate by Sex, Alberta, 1997 to 2006

| Female | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Respiratory distress cases** | 154 | 186 | 195 | 215 | 209 | 258 | 258 | 228 | 259 | 242 |
| **Live hospital births** | 17,630 | 18,051 | 18,364 | 17,823 | 17,931 | 18,503 | 19,245 | 19,443 | 20,146 | 21,556 |
| **Rate (per 1,000 hospital births)** | 8.7 | 10.3 | 10.6 | 12.1 | 11.7 | 13.9 | 13.4 | 11.7 | 12.9 | 11.2 |
| **Standard Error (SE)** | 0.70 | 0.75 | 0.76 | 0.82 | 0.80 | 0.86 | 0.83 | 0.77 | 0.79 | 0.72 |

| Male | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Respiratory distress cases** | 267 | 275 | 298 | 288 | 299 | 342 | 360 | 330 | 403 | 314 |
| **Live hospital births** | 18,587 | 19,107 | 19,038 | 18,449 | 18,902 | 19,395 | 20,207 | 20,516 | 21,046 | 22,634 |
| **Rate (per 1,000 hospital births)** | 14.4 | 14.4 | 15.7 | 15.6 | 15.8 | 17.6 | 17.8 | 16.1 | 19.1 | 13.9 |
| **Standard Error (SE)** | 0.87 | 0.86 | 0.90 | 0.91 | 0.91 | 0.95 | 0.93 | 0.88 | 0.94 | 0.78 |

Table 4.6.1.3 Respiratory Distress Cases and Rate by Birth Weight Group, Alberta, 1997 to 2006 Combined

| | < 1000 | 1000-1499 | 1500-2499 | 2500-4499 | >4499 | All |
|---|---|---|---|---|---|---|
| **Respiratory distress cases** | 735 | 881 | 1,782 | 1,428 | 38 | 5,380 |
| **Live hospital births** | 2,082 | 2,213 | 20,313 | 354,878 | 7,089 | 386,575 |
| **Rate (per 1,000 hospital births)** | 353.0 | 398.1 | 87.7 | 4.0 | 5.4 | 13.9 |
| **Standard Error (SE)** | 10.47 | 10.41 | 1.98 | 0.11 | 0.87 | 0.19 |

Table 4.6.1.4 Respiratory Distress Cases and Rate by Residence RHA, Alberta, 1997 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Respiratory distress cases** | 289 | 149 | 1,917 | 526 | 183 | 1,590 | 339 | 227 | 160 | 5,380 |
| **Live hospital births** | 20,480 | 12,536 | 137,200 | 36,544 | 9,387 | 114,217 | 24,315 | 19,608 | 12,262 | 386,575 |
| **Rate (per 1,000 hospital deliveries)** | 14.1 | 11.9 | 14.0 | 14.4 | 19.5 | 13.9 | 13.9 | 11.6 | 13.0 | 13.9 |
| **Standard Error (SE)** | 0.82 | 0.97 | 0.32 | 0.62 | 1.43 | 0.35 | 0.75 | 0.76 | 1.02 | 0.19 |

**Source:** Fee-For-Service Claims Files, Alberta Health and Wellness, extracted May 2008.
Ambulatory Care Classification System (ACCS), Alberta Health and Wellness, extracted May 2008.
Hospital Inpatient Files, Alberta Health and Wellness, extracted May 2008.

**Notes:** Totals for weight groups and RHAs include unknown weights or RHAs.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

## 4.6.2 Congenital Anomalies

Congenital anomaly: *An abnormality of body structure, function, or metabolism that results in a physical or mental disability or is fatal* (Pastuszak, 2000). Terminated pregnancies, stillbirths, and live births (diagnosed prior to one year of age), are collectively referred to as "total births" in this section.

Neural tube defects included in the following analyses *occur when the neural tube fails to close properly during early pregnancy (25 to 27 days after conception).* They are anencephaly (lack of cranial vault and cerebral hemispheres), spina bifida (open and closed defects in the spinal column), and encephalocele (lack of closure in the skull).

Heart septal defect: *A congenital defect in the septum, which separates the two sides of the heart, commonly found between the two atria or the two ventricles.*

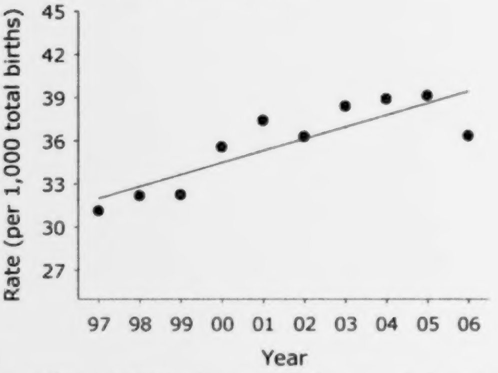
Down syndrome: *A condition characterized by unusual features, short stature, small head. Broad hands, moderate to severe intellectual disability, and a high prevalence of heart defects (30-40%). Down Syndrome is the result of abnormalities in chromosome 21 (Lowry, 2006).*

Rates for all congenital anomalies are per 1,000 total births (total births includes live births, stillbirths, and terminated pregnancies) in a given year.

Maternal risk factors for congenital anomalies include high maternal age, obesity, epilepsy controlled with anticonvulsant medications, and insulin-dependent diabetes (Health Canada, 2002).

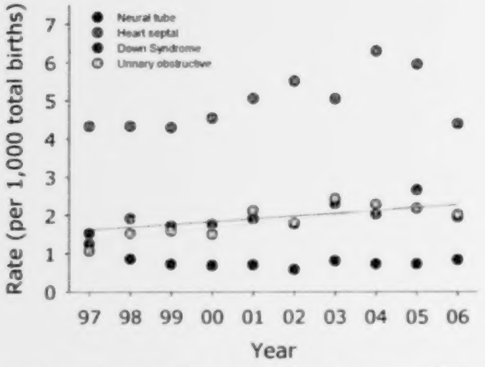
## Time Trends (see Table 4.6.2.1)

All Congenital Anomalies Combined Rate, Alberta, 1997 to 2006



- Between 1997 and 2006, the rate of all congenital anomalies combined increased linearly in Alberta. The drop in the 2006 likely reflects a delay in reporting of all cases (as is common with congenital anomalies). In 2006, the rate of all congenital anomalies combined was 36.3 (per 1,000 total births), or 1,634 reported anomalies in that year.

Congenital Anomalies Rates, Alberta, 1997 to 2006



- Rates for selected congenital anomalies between 1997 and 2006 are shown above. Down Syndrome and urinary obstructive defects showed significant linearly increasing trends over time. Lower 2006 rates likely reflect report delays.

## 4.6.2 Congenital Anomalies

High maternal age is a risk factor for Down syndrome. Children with Down syndrome have distinctive facial features (see Definition), cognitive deficits (most often they have a mild to moderate developmental delay) and increased risk of major congenital malformations such as congenital heart defects, gastrointestinal anomalies, or endocrine, visual or auditory dysfunction (Kohut, 2003).

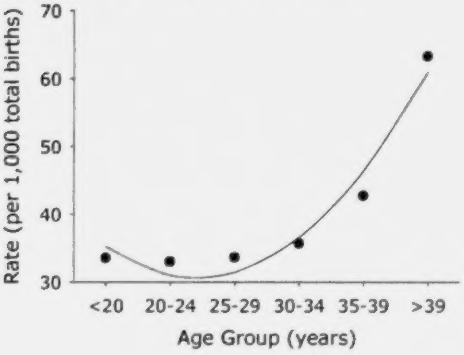
Maternal risk factors for neural tube defects include a previous pregnancy involving a neural tube defect, maternal diabetes, obesity, and epilepsy (Public Health Agency of Canada, 2008). Outcomes include miscarriage, stillbirth, infant or early childhood death, or lifelong disability (Health Canada, 2002). Maternal folic acid supplementation prior to conception reduces the occurrence of neural tube defects, and mandatory flour, pasta, and cornmeal fortification with folic acid has been shown to reduce neural tube defects in Canada (Public Health Agency of Canada, 2008).

Heart septal defects are a common anomaly and can often be repaired in infancy or early childhood. Untreated septal defects can lead to pulmonary hypertension.

In urinary obstructive defects, the flow of urine from the kidneys is obstructed. Urine cannot drain into the bladder and can back up into the kidneys, which can lead to persistent urinary tract infections and kidney damage or failure (Better Health Channel, 2008). This defect is often treatable, thus early detection is important to prevent kidney damage.

### Maternal Age Effects (see Table 4.6.2.2)

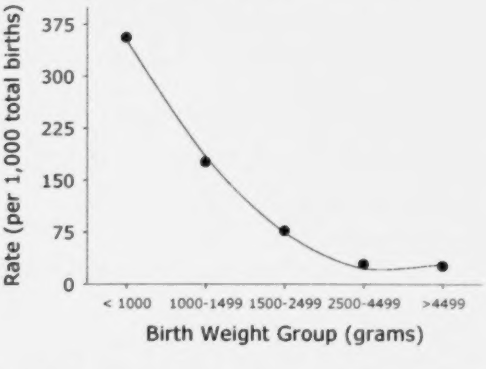
All Congenital Anomalies Combined Rate
by Maternal Age Group,
Alberta, 1997 to 2006 Combined



- For mothers under 35 years, the rate of all congenital anomalies combined varied between 33 and 36 (per 1,000 total births). The rate was higher for 35 to 39 year old mothers than for younger mothers, and was highest for mothers over 39. For 1997 to 2006 combined, the rate was 63.2 for women over 39 years of age.
- The rates for heart septal defects and Down Syndrome are higher for the oldest mothers than for younger mothers. There are no significant maternal age effects for neural tube or urinary obstructive anomalies, however.

### Birth Weight Effects (see Table 4.6.2.3)

All Congenital Anomalies Combined Rate
by Maternal Age Group,
Alberta, 1997 to 2006 Combined

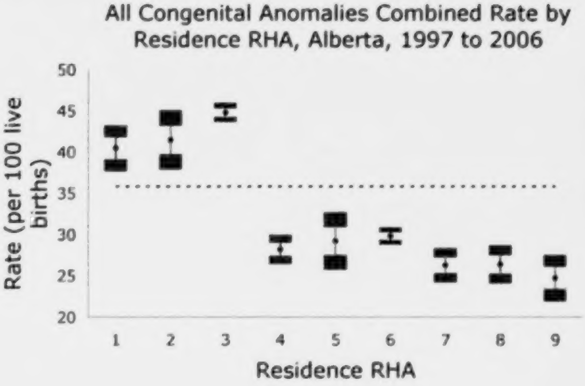


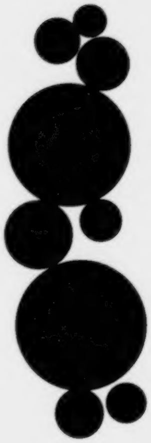
- The rate of all congenital anomalies combined was strongly affected by birth weight for 1997 to 2006 combined. The rate was 355.5 (per 1,000 total births, or more than one in three total births) for babies under 1,000 grams, compared with 25.6 for babies 4,500 grams or more.

## 4.6.2 Congenital Anomalies

All Congenital Anomalies Combined Rate, 1997-2006 Combined

## Regional Data (see Table 4.6.2.4)





- For 1997 to 2006 combined, the Albertan rate of all congenital anomalies combined was higher than the provincial average in RHAs 1, 2, and 3. This is partially related to the higher proportion of older mothers in these regions. The highest rate was 44.8 (per 1,000 total births) in RHA 3, compared with the lowest rate of 24.7 in RHA 9.

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

### Limitations and Methodology Notes

Congenital anomalies data were provided by the Alberta Congenital Anomalies Surveillance System. All congenital anomalies diagnosed within one year of birth are reported to this system.

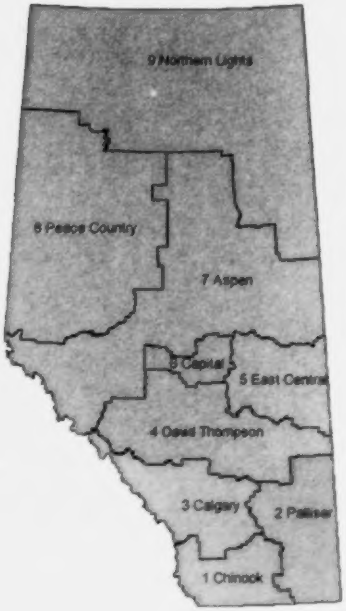
Detailed criteria for data extraction are provided in Appendix 6.1.1.

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002congenital anomalies data to data from prior years due to changes in data coding systems.

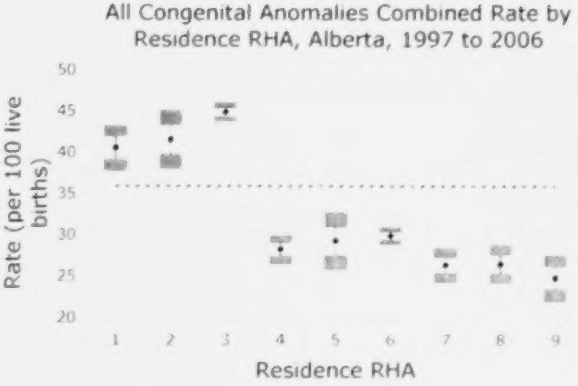
See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

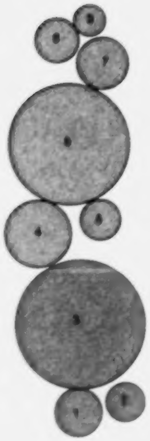
# 4.6.2 Congenital Anomalies

All Congenital Anomalies Combined Rate, 1997-2006 Combined



## Regional Data (see Table 4.6.2.4)





- For 1997 to 2006 combined, the Albertan rate of all congenital anomalies combined was higher than the provincial average in RHAs 1, 2, and 3. This is partially related to the higher proportion of older mothers in these regions. The highest rate was 44.8 (per 1,000 total births) in RHA 3, compared with the lowest rate of 24.7 in RHA 9.

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See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.6.2.1 Congenital Anomalies and Rates, Alberta, 1997 to 2006

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total births** | 36,797 | 37,715 | 38,044 | 36,860 | 37,454 | 38,540 | 40,120 | 40,570 | 41,890 | 44,954 |
| **All anomalies combined** | 1,145 | 1,213 | 1,226 | 1,310 | 1,400 | 1,398 | 1,540 | 1,578 | 1,639 | 1,634 |
| **All anomalies combined rate (per 1,000 total births)** | 31.1 | 32.2 | 32.2 | 35.5 | 37.4 | 36.3 | 38.4 | 38.9 | 39.1 | 36.3 |
| **Neural tube defect cases** | 46 | 32 | 27 | 25 | 26 | 22 | 32 | 29 | 30 | 37 |
| **Neural tube defect rate (per 1,000 total births)** | 1.3 | 0.8 | 0.7 | 0.7 | 0.7 | 0.6 | 0.8 | 0.7 | 0.7 | 0.8 |
| **Heart septal defect cases** | 159 | 163 | 163 | 167 | 189 | 212 | 202 | 255 | 249 | 197 |
| **Heart septal defect rate (per 1,000 total births)** | 4.3 | 4.3 | 4.3 | 4.5 | 5.0 | 5.5 | 5.0 | 6.3 | 5.9 | 4.4 |
| **Down Syndrome cases** | 56 | 72 | 65 | 65 | 71 | 68 | 92 | 82 | 111 | 87 |
| **Down Syndrome rate (per 1,000 total births)** | 1.5 | 1.9 | 1.7 | 1.8 | 1.9 | 1.8 | 2.3 | 2.0 | 2.6 | 1.9 |
| **Urinary obstruction defect cases** | 39 | 57 | 60 | 55 | 79 | 69 | 97 | 92 | 91 | 90 |
| **Urinary obstruction defect rate (per 1,000 total births)** | 1.1 | 1.5 | 1.6 | 1.5 | 2.1 | 1.8 | 2.4 | 2.3 | 2.2 | 2.0 |

* Data may be incomplete, as of Oct 30/08.

Table 4.6.2.2 Congenital Anomalies and Rates by Maternal Age Group, Alberta, 1997 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Total births** | 23,610 | 78,712 | 122,425 | 111,041 | 48,373 | 8,764 | 392,944 |
| **All anomalies combined** | 791 | 2,596 | 4,114 | 3,959 | 2,065 | 554 | 14,083 |
| **All anomalies combined rate (per 1,000 total births)** | 33.5 | 33.0 | 33.6 | 35.7 | 42.7 | 63.2 | 35.8 |
| **Neural tube defect cases** | 23 | 72 | 97 | 66 | 42 | 6 | 306 |
| **Neural tube defect rate (per 1,000 total births)** | 1.0 | 0.9 | 0.8 | 0.6 | 0.9 | 0.7 | 0.8 |
| **Heart septal defect cases** | 125 | 350 | 555 | 541 | 299 | 86 | 1,956 |
| **Heart septal defect rate (per 1,000 total births)** | 5.3 | 4.4 | 4.5 | 4.9 | 6.2 | 9.8 | 5.0 |
| **Down Syndrome cases** | 21 | 48 | 127 | 178 | 250 | 145 | 769 |
| **Down Syndrome rate (per 1,000 total births)** | 0.9 | 0.6 | 1.0 | 1.6 | 5.2 | 16.5 | 2.0 |
| **Urinary obstruction defect cases** | 40 | 139 | 224 | 202 | 106 | 18 | 729 |
| **Urinary obstruction defect rate (per 1,000 total births)** | 1.7 | 1.8 | 1.8 | 1.8 | 2.2 | 2.1 | 1.9 |

Table 4.6.2.3 Congenital Anomalies and Rates by Birth Weight Group, Alberta, 1997 to 2006 Combined

| | < 1000 | 1000-1499 | 1500-2499 | 2500-4499 | >4499 | All |
|---|---|---|---|---|---|---|
| **Total births** | 3,485 | 2,418 | 20,782 | 358,945 | 7,274 | 392,944 |
| **All anomalies combined** | 1,239 | 425 | 1,589 | 10,148 | 186 | 14,083 |
| **All anomalies combined rate (per 1,000 total births)** | 355.5 | 175.8 | 76.5 | 28.3 | 25.6 | 35.8 |
| **Neural tube defect cases** | 138 | 9 | 28 | 89 | 0 | 306 |
| **Neural tube defect rate (per 1,000 total births)** | 39.6 | 3.7 | 1.3 | 0.2 | 0.0 | 0.8 |
| **Heart septal defect cases** | 129 | 48 | 316 | 1,400 | 34 | 1,956 |
| **Heart septal defect rate (per 1,000 total births)** | 37.0 | 19.9 | 15.2 | 3.9 | 4.7 | 5.0 |
| **Down Syndrome cases** | 136 | 16 | 104 | 366 | 5 | 769 |
| **Down Syndrome rate (per 1,000 total births)** | 39.0 | 6.6 | 5.0 | 1.0 | 0.7 | 2.0 |
| **Urinary obstruction defect cases** | 69 | 19 | 88 | 527 | 16 | 729 |
| **Urinary obstruction defect rate (per 1,000 total births)** | 19.8 | 7.9 | 4.2 | 1.5 | 2.2 | 1.9 |

Table 4.6.2.4 All Congenital Anomalies Combined by RHA, Alberta, 1997 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total births** | 20,691 | 12,678 | 139,843 | 37,166 | 9,539 | 116,048 | 24,645 | 19,859 | 12,448 | 392,944 |
| **All anomalies combined** | 838 | 526 | 6,269 | 1,049 | 279 | 3,463 | 648 | 524 | 308 | 14,083 |
| **Rate (per 1000 total births)** | 40.5 | 41.5 | 44.8 | 28.2 | 29.2 | 29.8 | 26.3 | 26.4 | 24.7 | 35.8 |
| **Standard Error (SE)** | 1.37 | 1.77 | 0.55 | 0.86 | 1.73 | 0.50 | 1.02 | 1.14 | 1.39 | 0.30 |

**Source** Alberta Congenital Anomalies Surveillance System, 1980-2005, Oct. 2008 release

**Notes** Includes all congenital anomalies in and outside ICD-9 Chapter XIV or outside ICD-10 XVII. The number of patients was counted, one patient could belong to more than one diagnostic category

Totals for age and weight groups include unknown ages and weights

Data include Alberta residents only

Data may differ from previously published data due to differences in definitions and dates of data extraction and improvement in data quality

# 4. Births

## 4.7 Mortality

### 4.7.1 Stillbirths
### 4.7.2 Perinatal mortality
### 4.7.3 Neonatal mortality
### 4.7.4 Post-neonatal mortality
### 4.7.5 Infant mortality
### 4.7.6 Maternal Mortality

## 4.7.1 Stillbirths

Stillbirths refer to *births with "the complete expulsion or the extraction from the mother after at least 20 weeks pregnancy, or after attaining a weight of 500 grams or more, of a fetus in which, after the expulsion or the extraction, there is no breathing, beating of the heart, pulsation of the umbilical cord or unmistakable movement of voluntary muscle"* (Alberta Vital Statistics Act, RSA 1980, cV-4 s1). Note that definitions of stillbirth differ between provinces and between countries, making inter-jurisdictional comparisons difficult.

Stillbirth rate: *Number of stillbirths per 1,000 total births in a given year (total births is equal to the sum of live births and stillbirths).*

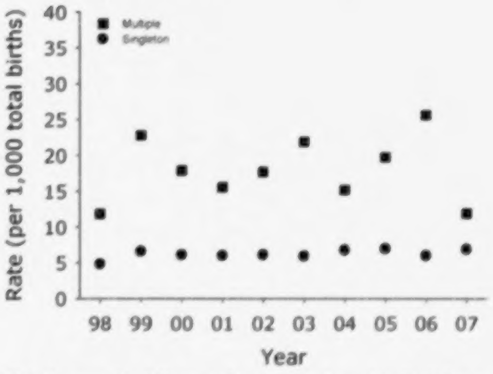
Causal factors in stillbirth are not well understood, but include fetal growth restriction, congenital anomalies, placental abruption, and intrauterine infection (Surkan, Stephansson, Dickman and Cnattingius, 2004).

Maternal risk factors for stillbirth include first birth, smoking, age 35 or older, obesity, less than high school education, previous stillbirth, multiple gestation, minority ethnicity, medical disorders (e.g., hypertensive disorders, diabetes, systemic lupus erythematosus, renal disease, thyroid disorders). Increased prenatal screening has resulted in reduction of stillbirths caused by chromosomal anomalies, due to termination of some of these pregnancies (Smith and Fretts, 2007).

The effect of advanced maternal age on stillbirth rates may be an effect of aging (such as reduced uterine vasculature), or of the increased incidence of chronic disease and medical or obstetric complications in older mothers (Huang, Sauve, Birkett, Fergusson, and van Walraven, 2008).

### Time Trends (see Tables 4.7.1.1, 4.7.1.2, 4.7.1.3, 4.7.1.4)

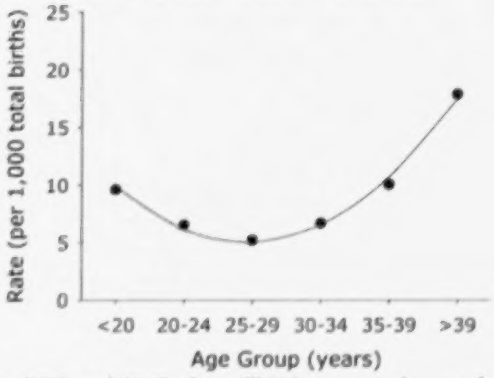
Stillbirth Rate by Plurality, Alberta, 1998 to 2007



- The stillbirth rate in Alberta from 1998 to 2007 did not vary significantly with time. In 2007, there were 342 stillbirths, for a rate of 7.1 (per 1,000 total births).
- In 2007, the stillbirth rate for multiples was 11.9 (per 1,000 total births), compared with 6.9 for singletons. The rate for multiples is quite variable, due to low numbers of both stillbirths and multiples.

### Maternal Age Effects (see Tables 4.7.1.5, 4.7.1.6)

Stillbirth Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined



- Between 2005 and 2007, the stillbirth rate was lowest for women 25 to 34 years of age, and highest for women over 39. The rate for women over 39 (17.8 per 1,000 total births) was more than three time that for women 25 to 29 (5.2).

### Gestational Age Effects (see Table 4.7.1.3)

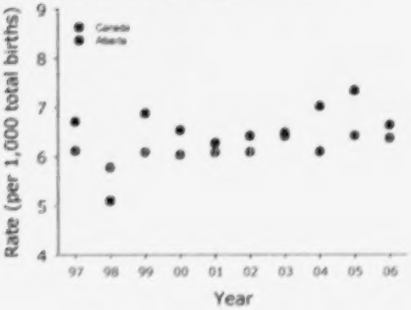
- Stillbirths are far more common prior to term than at term. In 2005, the stillbirth rate was 65.0 (per 1,000 total births) for preterm births, compared with 1.4 for term births.

## 4.7.1 Stillbirths

Between 1997 and 2006, there was no significant time trend in the stillbirth rate in Alberta or Canada, and Alberta and Canada rates did not differ from one another. In 2006, the stillbirth rate was 6.4 (per 1,000 total births) in Canada and 6.6 in Alberta (Statistics Canada, 2008c).

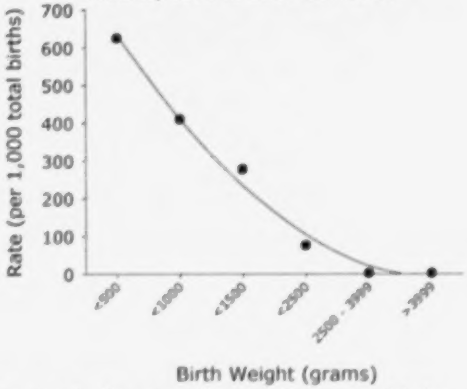
**Stillbirth Rate,**
**Alberta and Canada, 1997 to 2006**

Source: Statistics Canada (1999a,b, 2000, 2002, 2008c)



### Birth Weight Effects (see Table 4.7.1.4)

**Stillbirth Rate by Birth Weight Category,**
**Alberta, 1998 to 2007 Combined**



- Stillbirth rates decline steadily with increasing birth weight. The stillbirth rate was only 1.3 (per 1,000 total births) for birth weights of 2,500 to 3,999 grams, whereas more than 60% of babies under 500 grams are stillborn.

### Congenital Anomalies (see Tables 4.7.1.7, 4.7.1.8)

- Between 2002 and 2006, chromosomal anomalies were the most common type of anomaly in stillbirths, and accounted for 40.2% of stillbirths due to major anomalies. The majority of such stillbirths occurred with birth weights under 500 grams.

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### Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Stillbirth rates must be interpreted with caution due to the low number of cases in many categories.

### Table 4.7.1.1 Stillbirths and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 188 | 267 | 237 | 235 | 249 | 259 | 286 | 309 | 299 | 342 |
| **Total births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 1,000 total births)** | 5.0 | 7.1 | 6.5 | 6.3 | 6.5 | 6.5 | 7.1 | 7.4 | 6.7 | 7.1 |
| **Standard Error (SE)** | 0.36 | 0.43 | 0.42 | 0.41 | 0.41 | 0.40 | 0.42 | 0.42 | 0.39 | 0.38 |

### Table 4.7.1.2 Stillbirths and Rate by Plurality, Alberta, 1998 to 2007

| Multiple | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 12 | 24 | 20 | 18 | 22 | 29 | 21 | 27 | 38 | 19 |
| **Total births** | 1,014 | 1,053 | 1,118 | 1,158 | 1,243 | 1,323 | 1,380 | 1,365 | 1,480 | 1,593 |
| **Rate (per 1,000 total births)** | 11.8 | 22.8 | 17.9 | 15.5 | 17.7 | 21.9 | 15.2 | 19.8 | 25.7 | 11.9 |
| **Standard Error (SE)** | 3.40 | 4.60 | 3.96 | 3.64 | 3.74 | 4.03 | 3.30 | 3.77 | 4.11 | 2.72 |

| Singleton | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 176 | 243 | 217 | 217 | 227 | 230 | 265 | 282 | 261 | 323 |
| **Total births** | 36,703 | 36,992 | 35,744 | 36,303 | 37,299 | 38,804 | 39,198 | 40,531 | 43,478 | 47,097 |
| **Rate (per 1,000 total births)** | 4.8 | 6.6 | 6.1 | 6.0 | 6.1 | 5.9 | 6.8 | 7.0 | 6.0 | 6.9 |
| **Standard Error (SE)** | 0.36 | 0.42 | 0.41 | 0.40 | 0.40 | 0.39 | 0.41 | 0.41 | 0.37 | 0.38 |

### Table 4.7.1.3 Stillbirths and Rates by Preterm/Term, Alberta, 1998 to 2007

| <37 weeks (preterm) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 144 | 196 | 179 | 174 | 197 | 203 | 216 | 261 | 233 | 282 |
| **Total births** | 2,960 | 3,136 | 3,279 | 3,288 | 3,497 | 3,724 | 3,883 | 4,042 | 4,190 | 4,336 |
| **Rate (per 1,000 total births)** | 48.6 | 62.5 | 54.6 | 52.9 | 56.3 | 54.5 | 55.6 | 64.6 | 55.6 | 65.0 |
| **Standard Error (SE)** | 4.0 | 4.3 | 4.0 | 3.9 | 3.9 | 3.7 | 3.7 | 3.9 | 3.5 | 3.7 |

| 37-42 weeks (term) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 44 | 71 | 58 | 61 | 51 | 56 | 70 | 48 | 66 | 60 |
| **Total births** | 34,733 | 34,888 | 33,554 | 34,158 | 35,029 | 36,384 | 36,682 | 37,835 | 40,761 | 44,347 |
| **Rate (per 1,000 total births)** | 1.3 | 2.0 | 1.7 | 1.8 | 1.5 | 1.5 | 1.9 | 1.3 | 1.6 | 1.4 |
| **Standard Error (SE)** | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release

**Notes:** Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.7.1.4 Stillbirths and Rates by Birth Weight Categories, Alberta, 1998 to 2007

| <500 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 71 | 90 | 74 | 60 | 77 | 86 | 93 | 133 | 115 | 150 |
| **Total births** | 101 | 121 | 122 | 105 | 141 | 151 | 168 | 204 | 181 | 227 |
| **Rate (per 1,000 total births)** | 703.0 | 743.8 | 606.6 | 571.4 | 546.1 | 569.5 | 553.6 | 652.0 | 635.4 | 660.8 |
| **Standard Error (SE)** | 45.47 | 39.68 | 44.23 | 48.29 | 41.93 | 40.29 | 38.35 | 33.35 | 35.78 | 31.42 |

| <1000 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 104 | 138 | 132 | 116 | 136 | 155 | 159 | 198 | 182 | 219 |
| **Total births** | 270 | 322 | 346 | 312 | 362 | 369 | 389 | 464 | 437 | 489 |
| **Rate (per 1,000 total births)** | 385.2 | 428.6 | 381.5 | 371.8 | 375.7 | 420.1 | 408.7 | 426.7 | 416.5 | 447.9 |
| **Standard Error (SE)** | 29.62 | 27.58 | 26.11 | 27.36 | 25.45 | 25.69 | 24.93 | 22.96 | 23.58 | 22.49 |

| <1500 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 115 | 159 | 145 | 135 | 157 | 178 | 179 | 221 | 200 | 239 |
| **Total births** | 484 | 534 | 569 | 547 | 605 | 620 | 632 | 743 | 728 | 785 |
| **Rate (per 1,000 total births)** | 237.6 | 297.8 | 254.8 | 246.8 | 259.5 | 287.1 | 283.2 | 297.4 | 274.7 | 304.5 |
| **Standard Error (SE)** | 19.35 | 19.79 | 18.27 | 18.43 | 17.82 | 18.17 | 17.92 | 16.77 | 16.54 | 16.42 |

| <2500 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 143 | 197 | 169 | 172 | 193 | 208 | 224 | 259 | 239 | 282 |
| **Total births** | 2,473 | 2,440 | 2,420 | 2,439 | 2,679 | 2,725 | 2,813 | 2,987 | 3,348 | 3,496 |
| **Rate (per 1,000 total births)** | 57.8 | 80.7 | 69.8 | 70.5 | 72.0 | 76.3 | 79.6 | 86.7 | 71.4 | 80.7 |
| **Standard Error (SE)** | 4.69 | 5.52 | 5.18 | 5.18 | 5.00 | 5.09 | 5.10 | 5.15 | 4.45 | 4.61 |

| 2500 - 3999 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 38 | 63 | 57 | 57 | 50 | 50 | 56 | 46 | 54 | 50 |
| **Total births** | 30,604 | 30,834 | 29,718 | 30,220 | 31,084 | 32,567 | 33,075 | 34,248 | 36,621 | 39,863 |
| **Rate (per 1,000 total births)** | 1.2 | 2.0 | 1.9 | 1.9 | 1.6 | 1.5 | 1.7 | 1.3 | 1.5 | 1.3 |
| **Standard Error (SE)** | 0.20 | 0.26 | 0.25 | 0.25 | 0.23 | 0.22 | 0.23 | 0.20 | 0.20 | 0.18 |

| >3999 grams | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 7 | 7 | 11 | 6 | 6 | 1 | 6 | 4 | 6 | 10 |
| **Total births** | 4,647 | 4,775 | 4,729 | 4,807 | 4,781 | 4,844 | 4,695 | 4,673 | 4,995 | 5,339 |
| **Rate (per 1,000 total births)** | 1.5 | 1.5 | 2.3 | 1.2 | 1.3 | 0.2 | 1.3 | 0.9 | 1.2 | 1.9 |
| **Standard Error (SE)** | 0.57 | 0.55 | 0.70 | 0.51 | 0.51 | 0.21 | 0.52 | 0.43 | 0.49 | 0.59 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.

**Notes:** Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.1.5 Stillbirths and Rate by Maternal Age Group, Alberta, 2005 to 2007 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Stillbirths** | 67 | 168 | 221 | 260 | 174 | 60 | 950 |
| **Total births** | 6,997 | 25,881 | 42,783 | 39,126 | 17,390 | 3,362 | 135,541 |
| **Rate (per 1,000 total births)** | 9.6 | 6.5 | 5.2 | 6.6 | 10.0 | 17.8 | 7.0 |
| **Standard Error (SE)** | 1.16 | 0.50 | 0.35 | 0.41 | 0.75 | 2.28 | 0.23 |

Table 4.7.1.6 Stillbirths and Rates by Year and Maternal Age Group, Alberta, 1998 to 2007

| **Stillbirths** | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 21 | 20 | 20 | 19 | 21 | 19 | 22 | 27 | 20 | 20 |
| 20-24 | 31 | 52 | 44 | 46 | 45 | 59 | 59 | 60 | 44 | 64 |
| 25-29 | 53 | 79 | 66 | 51 | 60 | 73 | 74 | 71 | 71 | 79 |
| 30-34 | 51 | 66 | 67 | 63 | 68 | 66 | 80 | 83 | 97 | 80 |
| 35-39 | 26 | 39 | 29 | 41 | 42 | 31 | 39 | 55 | 44 | 75 |
| >39 | 6 | 11 | 11 | 15 | 13 | 11 | 12 | 13 | 23 | 24 |
| All | 188 | 267 | 237 | 235 | 249 | 259 | 286 | 309 | 299 | 342 |

| **Rate (per 1,000 total births)** | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 8.0 | 7.6 | 8.1 | 8.1 | 9.4 | 8.9 | 10.4 | 12.4 | 8.6 | 8.0 |
| 20-24 | 4.0 | 6.6 | 5.9 | 6.1 | 5.7 | 7.3 | 7.4 | 7.5 | 5.1 | 7.0 |
| 25-29 | 4.5 | 6.7 | 5.8 | 4.4 | 5.0 | 5.9 | 5.8 | 5.4 | 5.0 | 5.1 |
| 30-34 | 4.9 | 6.4 | 6.6 | 6.0 | 6.2 | 5.7 | 6.8 | 6.8 | 7.4 | 5.7 |
| 35-39 | 6.0 | 8.4 | 6.2 | 8.8 | 8.8 | 6.2 | 7.8 | 10.4 | 7.7 | 11.8 |
| >39 | 8.9 | 14.1 | 13.9 | 18.2 | 15.5 | 10.8 | 12.0 | 12.3 | 21.0 | 19.9 |
| All | 5.0 | 7.0 | 6.4 | 6.3 | 6.5 | 6.5 | 7.0 | 7.4 | 6.7 | 7.0 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.

**Notes:** Data include Alberta residents only.
Totals for age groups include unknown ages.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.1.7 Major Anomalies as Cause of Death by Type of Death, Stillbirths and Neonatal Deaths, Alberta, 2002 to 2006

| | 2002 | | | 2003 | | | 2004 | | | 2005 | | | 2006 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Stillbirths** | **Neonatal Deaths** | **% of All Deaths** | **Stillbirths** | **Neonatal Deaths** | **% of All Deaths** | **Stillbirths** | **Neonatal Deaths** | **% of All Deaths** | **Stillbirths** | **Neonatal Deaths** | **% of All Deaths** | **Stillbirths** | **Neonatal Deaths** | **% of All Deaths** |
| **Neural Tube Defects/ Other Central Nervous System** | 6 | 8 | 3.1 | 11 | 12 | 5.1 | 9 | 13 | 4.7 | 7 | 11 | 3.4 | 22 | 6 | 5.8 |
| **Cardio-Respiratory** | 11 | 12 | 5.1 | 8 | 12 | 4.4 | 11 | 12 | 4.9 | 12 | 8 | 3.8 | 6 | 10 | 3.3 |
| **Gastrointestinal / Musculoskeletal / Integument** | 2 | 13 | 3.3 | 5 | 10 | 3.3 | 8 | 7 | 3.2 | 8 | 8 | 3.1 | 3 | 9 | 2.5 |
| **Genitourinary** | 6 | 13 | 4.2 | 7 | 12 | 4.2 | 6 | 9 | 3.2 | 8 | 9 | 3.3 | 8 | 6 | 2.9 |
| **Chromosomal** | 30 | 21 | 11.2 | 11 | 15 | 5.7 | 29 | 15 | 9.4 | 42 | 33 | 14.3 | 29 | 18 | 9.8 |
| **Unspecified Congenital/Multiple Systems** | 7 | 9 | 3.5 | 14 | 9 | 5.1 | 10 | 10 | 4.3 | 2 | 7 | 1.7 | 13 | 12 | 5.2 |
| **Total** | 62 | 76 | 30.3 | 56 | 70 | 27.8 | 73 | 66 | 29.7 | 79 | 76 | 29.6 | 81 | 61 | 29.5 |

**Source:** Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals. August 2008 release

**Notes:** Data include Alberta residents only

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.7.1.8 Major Anomalies as Cause of Death by Type of Death and Birth Weight Category (grams), Alberta, 2005, 2006

| | **Stillbirths** | | | **Early Neonatal Deaths** | | | **Late Neonatal Deaths** | | | **Total Deaths** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | **<500** | **500-999** | **>999** | **<500** | **500-999** | **>999** | **<500** | **500-999** | **>999** | **Stillbirths** | **Early Neonatal** | **Late Neonatal** |
| **Neural Tube Defects** | 2 | 1 | 1 | 6 | 1 | 1 | 0 | 0 | 0 | 4 | 8 | 0 |
| **Other Central Nervous System** | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 3 | 3 | 0 |
| **Heart** | 6 | 1 | 4 | 2 | 1 | 0 | 0 | 0 | 1 | 11 | 3 | 1 |
| **Circulatory System** | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| **Respiratory System** | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 3 | 0 |
| **Gastrointestinal System** | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 3 | 1 |
| **Genital Organs** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Urinary System** | 2 | 5 | 1 | 2 | 1 | 6 | 0 | 0 | 0 | 8 | 9 | 0 |
| **Musculoskeletal Deformity** | 5 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 5 | 4 | 0 |
| **Integument** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| **Chromosomal** | 14 | 14 | 11 | 11 | 14 | 7 | 0 | 0 | 1 | 42 | 32 | 1 |
| **Other/Unspecified Congenital** | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 3 | 2 | 4 | 3 |
| **Total** | 35 | 23 | 18 | 27 | 20 | 23 | 0 | 0 | 6 | 79 | 70 | 6 |

| | **Stillbirths** | | | **Early Neonatal Deaths** | | | **Late Neonatal Deaths** | | | **Total Deaths** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2006 | **<500** | **500-999** | **>999** | **<500** | **500-999** | **>999** | **<500** | **500-999** | **>999** | **Stillbirths** | **Early Neonatal** | **Late Neonatal** |
| **Neural Tube Defects** | 7 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 10 | 3 | 0 |
| **Other Central Nervous System** | 8 | 4 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 13 | 2 | 1 |
| **Heart** | 4 | 0 | 0 | 2 | 1 | 3 | 0 | 1 | 0 | 4 | 6 | 1 |
| **Circulatory System** | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| **Respiratory System** | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 0 |
| **Gastrointestinal System** | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| **Genital Organs** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Urinary System** | 3 | 3 | 2 | 1 | 1 | 4 | 0 | 0 | 0 | 8 | 6 | 0 |
| **Musculoskeletal Deformity** | 0 | 1 | 1 | 3 | 1 | 3 | 0 | 0 | 1 | 2 | 7 | 1 |
| **Integument** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Chromosomal** | 17 | 3 | 7 | 7 | 4 | 5 | 0 | 0 | 2 | 29 | 16 | 2 |
| **Other/Unspecified Congenital** | 11 | 2 | 0 | 5 | 1 | 4 | 0 | 0 | 2 | 13 | 10 | 2 |
| **Total** | 50 | 16 | 11 | 20 | 9 | 25 | 0 | 1 | 6 | 81 | 54 | 7 |

**Source:** Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals. August 2008 release

**Notes:** Three 2005 stillbirths with congenital anomalies had no weight documented; there were four stillbirths with no weight documented in 2006

Data include Alberta residents only

Data may differ from previously published data due to differences in definitions and dates of data extraction

## 4.7.2 Perinatal Mortality

Perinatal deaths *include stillbirths and early neonatal deaths (deaths under seven days of age). A fetal death is registered as a stillbirth in Alberta if delivery occurs at or after 20 weeks of pregnancy or if the fetal weight is 500 grams or greater and gestational age is not known.*

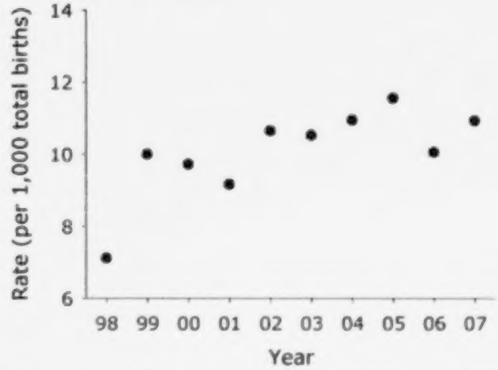
Perinatal mortality rate: Number of perinatal deaths per 1,000 total births in a given year (total births is equal to the sum of live births and stillbirths).

Male gender, maternal smoking, black race, low gestational age, fetal growth restriction, and multiple birth are risk factors for perinatal death (Joseph et al., 2004, 2005).

Comparisons of birth weight-specific perinatal mortality rates must be made with caution. A recent study of Canadian births showed that birth weight information was most likely to be missing for fetal deaths, and least likely to be missing in infants surviving to at least one year of age. Thus, bias occurs in calculating weight-specific mortality rates (Wen, Chen, Li, Kramer, & Allen, 2002).

### Time Trends (see Table 4.7.2.1)

Perinatal Mortality Rate, Alberta, 1998 to 2007



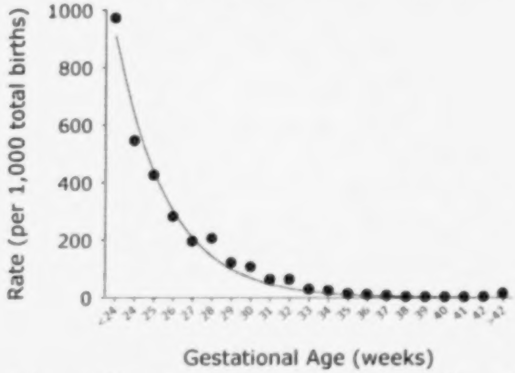
- In 2007, there were 532 perinatal deaths (10.5 per 1,000 total births). There was no time trend in this rate from 1998 to 2007.

### Maternal Age Effects (see Tables 4.7.2.2, 4.7.2.3)

- Perinatal mortality rates are somewhat elevated for mothers over 39 years of age, but the number of deaths is too small for reliable comparisons between age groups.

### Gestational Age Effects (see Tables 4.7.2.4 and 4.7.2.5)

Perinatal Mortality Rate by Gestational Age, Alberta, 2002 to 2006 Combined



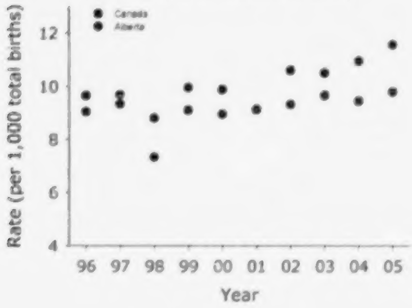
- Perinatal mortality rates show an exponential decline with increasing gestational age. The 2002 to 2006 combined rates ranged from 971.2 (per 1,000 total births) at less than 24 weeks gestation, to 1.3 for gestational ages of 40 and 41 weeks.

## 4.7.2 Perinatal Mortality

The 2005 perinatal mortality rate was 9.8 in Canada and 11.6 in Alberta (Statistics Canada, 2008c, d). The Albertan rate is consistently slightly higher than the Canadian rate, and was significantly higher in 2004 and 2005. Registration of live births under 500 grams has been routine in Alberta since 1990, elevating the perinatal, neonatal, and infant mortality rates in Alberta relative to the rest of Canada, where such births are not universally registered.

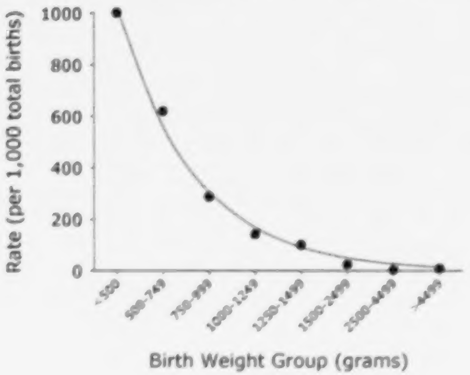
Perinatal Mortality Rate, Alberta and Canada, 1996 to 2005

Source: Statistics Canada (1999a,b, 2000, 2002, 2008c,d)



### Birth Weight Effects (see Table 4.7.2.6)

Perinatal Mortality Rate by Birth Weight Group, Alberta, 2002 to 2006 Combined



- Perinatal mortality rates for 2000 to 2004 combined decrease exponentially with increasing birth weight.
- All infants under 500 grams who were born between 2002 and 2006 died before birth or before 7 days of life. The lowest perinatal mortality rate (2.0 per 1,000 total births) occurred in infants with birth weights between 2,500 and 4,499 grams. When corrected for major congenital anomalies, this rate was 1.6.

### Congenital Anomalies (see Table 4.7.1.7, 4.7.1.8)

- Chromosomal anomalies were the leading cause of perinatal deaths due to major anomalies between 2002 and 2006.

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Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Perinatal mortality rates must be interpreted with caution due to the low number of cases in many categories.

## Table 4.7.2.1 Perinatal Deaths and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Perinatal Deaths** | 268 | 380 | 358 | 343 | 410 | 422 | 444 | 484 | 452 | 532 |
| **Total births** | 37,717 | 38,045 | 36,862 | 37,461 | 38,542 | 40,127 | 40,578 | 41,896 | 44,958 | 48,690 |
| **Rate (per 1,000 total births)** | 7.1 | 10.0 | 9.7 | 9.2 | 10.6 | 10.5 | 10.9 | 11.6 | 10.1 | 10.9 |
| **Standard Error (SE)** | 0.43 | 0.51 | 0.51 | 0.49 | 0.52 | 0.51 | 0.52 | 0.52 | 0.47 | 0.47 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release
Vital Statistics, Death File, Service Alberta, May 2008 release

**Notes:** Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

## Table 4.7.2.2 Perinatal and Neonatal Deaths and Rates by Maternal Age Group, Alberta, 2005, 2006

| 2005 | <18 | 18-29 | 30-39 | >34 | >39 | Total |
|---|---|---|---|---|---|---|
| **Stillbirths** | 9 | 148 | 146 | 74 | 15 | 318 |
| **Early neonatal deaths** | 1 | 96 | 63 | 30 | 11 | 171 |
| **Late neonatal deaths** | 2 | 23 | 7 | 4 | 2 | 34 |
| **% of deaths[1]** | 2.3 | 51.1 | 41.3 | 20.7 | 5.4 | 100.0 |
| **Live births** | 600 | 22,638 | 17,303 | 6,284 | 1,045 | 41,587 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 16.4 | 10.7 | 12.0 | 16.4 | 24.5 | 11.7 |
| **Perinatal mortality rate standard error (SE)** | 5.1 | 0.7 | 0.8 | 1.6 | 4.8 | 0.5 |
| **Corrected perinatal mortality rate[4]** | 11.6 | 8.1 | 8.4 | 10.1 | 13.4 | 8.4 |
| **Corrected perinatal mortality rate SE** | 4.3 | 0.6 | 0.7 | 1.3 | 3.5 | 0.4 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 5.0 | 5.3 | 4.0 | 5.4 | 12.4 | 4.9 |
| **Neonatal mortality rate SE** | 2.9 | 0.5 | 0.5 | 0.9 | 3.4 | 0.3 |
| **Corrected neonatal mortality rate[4]** | 5.0 | 3.8 | 2.7 | 2.4 | 5.7 | 3.4 |
| **Corrected neonatal mortality rate SE** | 2.9 | 0.4 | 0.4 | 0.6 | 2.3 | 0.3 |

| 2006 | <18 | 18-29 | 30-39 | >34 | >39 | Total |
|---|---|---|---|---|---|---|
| **Stillbirths** | 4 | 135 | 148 | 68 | 23 | 310 |
| **Early neonatal deaths** | 9 | 72 | 68 | 19 | 2 | 151 |
| **Late neonatal deaths** | 1 | 13 | 6 | 4 | 1 | 21 |
| **% of deaths[1]** | 2.9 | 45.6 | 46.1 | 18.9 | 5.4 | 100.0 |
| **Live births** | 715 | 24,233 | 18,638 | 6,780 | 1,073 | 44,659 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 18.1 | 8.5 | 11.5 | 12.7 | 22.8 | 10.3 |
| **Perinatal mortality rate standard error (SE)** | 5.0 | 0.6 | 0.8 | 1.4 | 4.5 | 0.5 |
| **Corrected perinatal mortality rate[4]** | 15.3 | 6.3 | 8.0 | 8.4 | 15.6 | 7.3 |
| **Corrected perinatal mortality rate SE** | 4.6 | 0.5 | 0.6 | 1.1 | 3.8 | 0.4 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 14.0 | 3.5 | 4.0 | 3.4 | 2.8 | 3.9 |
| **Neonatal mortality rate SE** | 4.4 | 0.4 | 0.5 | 0.7 | 1.6 | 0.3 |
| **Corrected neonatal mortality rate[4]** | 11.2 | 2.4 | 2.5 | 1.9 | 1.9 | 2.6 |
| **Corrected neonatal mortality rate SE** | 3.9 | 0.3 | 0.4 | 0.5 | 1.3 | 0.2 |

**Source:** Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release
Vital Statistics, Birth File, Service Alberta, May 2008 release

**Notes:** 1 % of deaths = (total deaths for a given age group) / (total deaths for all ages) x 100
2 ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000
3 ((early neonatal deaths + late neonatal deaths) / live births) x 1000
4 Corrected rates exclude deaths due to major congenital anomalies
Total columns include unknown maternal ages
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

Table 4.7.2.3 Perinatal and Neonatal Deaths and Rates by Maternal Age Group, excluding <500 grams, Alberta, 2005, 2006

| 2005 | <18 | 18-29 | 30-39 | >34 | >39 | Total |
|---|---|---|---|---|---|---|
| **Stillbirths** | 6 | 88 | 74 | 42 | 8 | 176 |
| **Early neonatal deaths** | 0 | 65 | 31 | 13 | 5 | 101 |
| **Late neonatal deaths** | 2 | 23 | 7 | 4 | 2 | 34 |
| **% of deaths[1]** | 2.6 | 56.6 | 36.0 | 19.0 | 4.8 | 100.0 |
| **Live births** | 599 | 22,608 | 17,269 | 6,266 | 1,039 | 41,516 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 9.9 | 6.7 | 6.1 | 8.7 | 12.4 | 6.6 |
| **Perinatal mortality rate standard error (SE)** | 4.0 | 0.5 | 0.6 | 1.2 | 3.4 | 0.4 |
| **Corrected perinatal mortality rate[4]** | 5.0 | 5.3 | 4.5 | 5.6 | 6.7 | 5.1 |
| **Corrected perinatal mortality rate SE** | 2.9 | 0.5 | 0.5 | 0.9 | 2.5 | 0.4 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 3.3 | 3.9 | 2.2 | 2.7 | 6.7 | 3.3 |
| **Neonatal mortality rate SE** | 2.4 | 0.4 | 0.4 | 0.7 | 2.5 | 0.3 |
| **Corrected neonatal mortality rate[4]** | 3.3 | 2.8 | 1.6 | 1.0 | 2.9 | 2.1 |
| **Corrected neonatal mortality rate SE** | 2.4 | 0.4 | 0.3 | 0.4 | 1.7 | 0.2 |

| 2006 | <18 | 18-29 | 30-39 | >34 | >39 | Total |
|---|---|---|---|---|---|---|
| **Stillbirths** | 3 | 81 | 82 | 37 | 14 | 180 |
| **Early neonatal deaths** | 6 | 42 | 42 | 13 | 0 | 90 |
| **Late neonatal deaths** | 1 | 12 | 6 | 4 | 1 | 20 |
| **% of deaths[1]** | 3.4 | 46.6 | 44.8 | 18.6 | 5.2 | 100.0 |
| **Live births** | 712 | 24,201 | 18,609 | 6,773 | 1,071 | 44,593 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 12.6 | 5.1 | 6.6 | 7.3 | 12.9 | 6.0 |
| **Perinatal mortality rate standard error (SE)** | 4.2 | 0.5 | 0.6 | 1.0 | 3.4 | 0.4 |
| **Corrected perinatal mortality rate[4]** | 9.8 | 4.1 | 5.1 | 5.3 | 8.3 | 4.5 |
| **Corrected perinatal mortality rate SE** | 3.7 | 0.4 | 0.5 | 0.9 | 2.8 | 0.3 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 9.8 | 2.2 | 2.6 | 2.5 | 0.9 | 2.5 |
| **Neonatal mortality rate SE** | 3.7 | 0.3 | 0.4 | 0.6 | 0.9 | 0.2 |
| **Corrected neonatal mortality rate[4]** | 7.0 | 1.4 | 1.7 | 1.6 | 0.0 | 1.5 |
| **Corrected neonatal mortality rate SE** | 3.1 | 0.2 | 0.3 | 0.5 | 0.0 | 0.2 |

**Source:** Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.
Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** 1. % of deaths = (total deaths for a given age group) / (total deaths for all ages) x 100.
2. ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000.
3. ((early neonatal deaths + late neonatal deaths) / live births) x 1000.
4. Corrected rates exclude deaths due to major congenital anomalies.
Total columns include unknown maternal ages.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

## Table 4.7.2.4 Perinatal and Neonatal Deaths and Rate by Length of Gestation (weeks), Alberta, 2005, 2006, and 2002 to 2006 Combined

| 2005 | <24* | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 150 | 11 | 7 | 13 | 7 | 12 | 3 | 7 | 12 | 11 | 9 |
| **Early neonatal deaths** | 101 | 16 | 11 | 7 | 4 | 4 | 2 | 3 | 1 | 0 | 0 |
| **Late neonatal deaths** | 2 | 4 | 4 | 4 | 1 | 0 | 0 | 2 | 1 | 0 | 1 |
| **% of deaths[1]** | 48.4 | 5.9 | 4.2 | 4.6 | 2.3 | 3.1 | 1.0 | 2.3 | 2.7 | 2.1 | 1.9 |
| **Live births** | 106 | 35 | 30 | 49 | 59 | 52 | 59 | 88 | 110 | 224 | 239 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 980.5 | 587.0 | 486.5 | 322.6 | 166.7 | 250.0 | 80.6 | 105.3 | 106.6 | 46.8 | 36.3 |
| **Perinatal mortality rate standard error (SE)** | 8.6 | 72.6 | 82.2 | 59.4 | 45.9 | 54.1 | 34.6 | 31.5 | 27.9 | 13.8 | 11.9 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 971.7 | 571.4 | 500.0 | 224.5 | 84.7 | 76.9 | 33.9 | 56.8 | 18.2 | 0.0 | 4.2 |
| **Neonatal mortality rate standard error (SE)** | 16.1 | 83.6 | 91.3 | 59.6 | 36.3 | 37.0 | 23.6 | 24.7 | 12.7 | 0.0 | 4.2 |

| 2005 continued | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | >42 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 4 | 7 | 15 | 9 | 10 | 16 | 13 | 2 | 0 | 0 | 318 |
| **Early neonatal deaths** | 2 | 3 | 3 | 5 | 1 | 5 | 1 | 1 | 1 | 0 | 171 |
| **Late neonatal deaths** | 0 | 0 | 3 | 1 | 6 | 4 | 1 | 0 | 0 | 0 | 34 |
| **% of deaths[1]** | 1.1 | 1.9 | 4.0 | 2.9 | 3.3 | 4.8 | 2.9 | 0.6 | 0.2 | 0.0 | 100.0 |
| **Live births** | 534 | 657 | 1,539 | 2,999 | 6,959 | 10,075 | 11,544 | 5,928 | 282 | 19 | 41,587 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 11.2 | 15.1 | 11.6 | 4.7 | 1.6 | 2.1 | 1.2 | 0.5 | 3.5 | 0.0 | 11.7 |
| **Perinatal mortality rate standard error (SE)** | 4.5 | 4.7 | 2.7 | 1.2 | 0.5 | 0.5 | 0.3 | 0.3 | 3.5 | 0.0 | 0.5 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 3.7 | 4.6 | 3.9 | 2.0 | 1.0 | 0.9 | 0.2 | 0.2 | 3.5 | 0.0 | 4.9 |
| **Neonatal mortality rate standard error (SE)** | 2.6 | 2.6 | 1.6 | 0.8 | 0.4 | 0.3 | 0.1 | 0.2 | 3.5 | 0.0 | 0.3 |

| 2006 | <24* | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 131 | 12 | 12 | 9 | 6 | 13 | 8 | 4 | 5 | 7 | 7 |
| **Early neonatal deaths** | 85 | 14 | 7 | 3 | 2 | 6 | 1 | 2 | 0 | 6 | 2 |
| **Late neonatal deaths** | 1 | 3 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| **% of deaths[1]** | 45.0 | 6.0 | 4.4 | 2.7 | 1.7 | 3.9 | 1.9 | 1.5 | 1.0 | 2.7 | 2.1 |
| **Live births** | 93 | 31 | 37 | 49 | 37 | 55 | 80 | 91 | 147 | 198 | 283 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 1,000.0 | 604.7 | 387.8 | 206.9 | 186.0 | 279.4 | 102.3 | 63.2 | 32.9 | 63.4 | 31.0 |
| **Perinatal mortality rate standard error (SE)** | 0.0 | 74.6 | 69.6 | 53.2 | 59.3 | 54.4 | 32.3 | 25.0 | 14.5 | 17.0 | 10.2 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 1,000.0 | 548.4 | 243.2 | 81.6 | 54.1 | 109.1 | 12.5 | 33.0 | 0.0 | 30.3 | 10.6 |
| **Neonatal mortality rate standard error (SE)** | 0.0 | 89.4 | 70.5 | 39.1 | 37.2 | 42.0 | 12.4 | 18.7 | 0.0 | 12.2 | 6.1 |

| 2006 continued | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | >42 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 10 | 7 | 9 | 20 | 20 | 14 | 9 | 7 | 0 | 0 | 310 |
| **Early neonatal deaths** | 4 | 2 | 3 | 2 | 3 | 6 | 3 | 9 | 0 | 0 | 151 |
| **Late neonatal deaths** | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 2 | 0 | 0 | 21 |
| **% of deaths[1]** | 3.1 | 2.1 | 2.7 | 5.2 | 5.0 | 4.4 | 2.9 | 1.9 | 0.0 | 0.0 | 100.0 |
| **Live births** | 507 | 821 | 1,528 | 3,377 | 7,788 | 11,401 | 11,845 | 6,068 | 216 | 7 | 44,659 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 27.1 | 10.9 | 7.8 | 6.5 | 2.9 | 1.8 | 1.0 | 1.2 | 0.0 | 0.0 | 10.3 |
| **Perinatal mortality rate standard error (SE)** | 7.1 | 3.6 | 2.2 | 1.4 | 0.6 | 0.4 | 0.3 | 0.4 | 0.0 | 0.0 | 0.5 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 9.9 | 3.7 | 2.6 | 1.5 | 0.5 | 0.6 | 0.4 | 0.3 | 0.0 | 0.0 | 3.9 |
| **Neonatal mortality rate standard error (SE)** | 4.4 | 2.1 | 1.3 | 0.7 | 0.3 | 0.2 | 0.2 | 0.2 | 0.0 | 0.0 | 0.3 |

| 2002 to 2006 combined | <24* | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 617 | 52 | 40 | 49 | 37 | 46 | 31 | 38 | 31 | 52 | 31 |
| **Early neonatal deaths** | 463 | 58 | 37 | 26 | 12 | 19 | 11 | 12 | 7 | 10 | 5 |
| **Late neonatal deaths** | 14 | 14 | 11 | 12 | 6 | 1 | 2 | 5 | 1 | 2 | 6 |
| **% of deaths[1]** | 45.6 | 5.2 | 3.7 | 3.6 | 2.3 | 2.7 | 1.8 | 2.3 | 1.6 | 2.7 | 1.7 |
| **Live births** | 495 | 150 | 141 | 218 | 214 | 271 | 318 | 435 | 587 | 941 | 1,250 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 971.2 | 544.6 | 425.4 | 280.9 | 195.2 | 205.0 | 120.3 | 105.7 | 61.5 | 62.4 | 28.1 |
| **Perinatal mortality rate standard error (SE)** | 5.0 | 35.0 | 36.7 | 27.5 | 25.0 | 22.7 | 17.4 | 14.1 | 9.7 | 7.7 | 4.6 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 963.6 | 480.0 | 340.4 | 174.3 | 84.1 | 73.8 | 40.9 | 39.1 | 13.6 | 12.8 | 8.8 |
| **Neonatal mortality rate standard error (SE)** | 8.4 | 40.8 | 39.9 | 25.7 | 19.0 | 15.9 | 11.1 | 9.3 | 4.8 | 3.7 | 2.6 |

| 2002 to 2006 combined continued | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | >42 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 42 | 35 | 52 | 78 | 74 | 67 | 61 | 25 | 3 | 1 | 1460 |
| **Early neonatal deaths** | 14 | 11 | 23 | 16 | 17 | 28 | 16 | 14 | 1 | 0 | 800 |
| **Late neonatal deaths** | 7 | 3 | 9 | 7 | 12 | 13 | 10 | 6 | 0 | 0 | 141 |
| **% of deaths[1]** | 2.6 | 2.0 | 3.5 | 4.1 | 4.3 | 4.5 | 3.6 | 1.9 | 0.2 | 0.0 | 100.0 |
| **Live births** | 2,331 | 3,552 | 7,323 | 14,547 | 33,840 | 49,354 | 57,632 | 29,389 | 1,638 | 73 | 204,699 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 23.6 | 12.8 | 10.2 | 6.3 | 2.7 | 1.9 | 1.3 | 1.3 | 2.4 | 13.5 | 11.0 |
| **Perinatal mortality rate standard error (SE)** | 3.1 | 1.9 | 1.2 | 0.7 | 0.3 | 0.2 | 0.2 | 0.2 | 1.2 | 13.4 | 0.2 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 9.0 | 3.9 | 4.4 | 1.6 | 0.9 | 0.8 | 0.5 | 0.7 | 0.6 | 0.0 | 4.6 |
| **Neonatal mortality rate standard error (SE)** | 2.0 | 1.1 | 0.8 | 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.6 | 0.0 | 0.1 |

**Source:** Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals. August 2008 release
Vital Statistics, Birth File, Service Alberta, May 2008 release

**Notes:** 1 % of deaths = (total deaths for a given gestational age) / (total deaths at all gestational ages) x 100
2 ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000
3 ((early neonatal deaths + late neonatal deaths) / live births) x 1000
Total columns include unknown gestational ages
* There may be more deaths than births in this category due to the fact that some live births and stillbirths are inconsistently registered. Total birth numbers are from the Vital Statistics database, in which some births < 500 grams are apparently not registered. The perinatal deaths come from the Medical Records departments, which have the death records for these unregistered births. The rates have consequently been adjusted downward to 1,000 where necessary to correct for this fact.
Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.7.2.5 Perinatal and Neonatal Deaths and Rate by Length of Gestation (weeks), excluding births <500 grams, Alberta, 2005, 2006, and 2002 to 2006 Combined

| 2005 | <24* | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 29 | 5 | 4 | 7 | 4 | 12 | 2 | 7 | 12 | 11 | 9 |
| **Early neonatal deaths** | 32 | 15 | 11 | 7 | 4 | 4 | 2 | 3 | 1 | 0 | 0 |
| **Late neonatal deaths** | 2 | 4 | 4 | 4 | 1 | 0 | 0 | 2 | 1 | 0 | 1 |
| **% of deaths[1]** | 20.3 | 7.7 | 6.1 | 5.8 | 2.9 | 5.1 | 1.3 | 3.9 | 4.5 | 3.5 | 3.2 |
| **Live births** | 37 | 33 | 30 | 49 | 59 | 52 | 59 | 88 | 110 | 224 | 239 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 924.2 | 526.3 | 441.2 | 250.0 | 127.0 | 250.0 | 65.6 | 105.3 | 106.6 | 46.8 | 36.3 |
| **Perinatal mortality rate standard error (SE)** | 32.6 | 81.0 | 85.2 | 57.9 | 41.9 | 54.1 | 31.7 | 31.5 | 27.9 | 13.8 | 11.9 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 918.9 | 575.8 | 500.0 | 224.5 | 84.7 | 76.9 | 33.9 | 56.8 | 18.2 | 0.0 | 4.2 |
| **Neonatal mortality rate standard error (SE)** | 44.9 | 86.0 | 91.3 | 59.6 | 36.3 | 37.0 | 23.6 | 24.7 | 12.7 | 0.0 | 4.2 |

| 2005 continued | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | >42 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 2 | 7 | 15 | 9 | 10 | 16 | 13 | 2 | 0 | 0 | 176 |
| **Early neonatal deaths** | 2 | 3 | 3 | 5 | 1 | 5 | 1 | 1 | 1 | 0 | 101 |
| **Late neonatal deaths** | 0 | 0 | 3 | 1 | 6 | 4 | 1 | 0 | 0 | 0 | 34 |
| **% of deaths[1]** | 1.3 | 3.2 | 6.8 | 4.8 | 5.5 | 8.0 | 4.8 | 1.0 | 0.3 | 0.0 | 100.0 |
| **Live births** | 534 | 657 | 1,539 | 2,999 | 6,959 | 10,075 | 11,544 | 5,928 | 282 | 19 | 41,516 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 7.5 | 15.1 | 11.6 | 4.7 | 1.6 | 2.1 | 1.2 | 0.5 | 3.5 | 0.0 | 6.6 |
| **Perinatal mortality rate standard error (SE)** | 3.7 | 4.7 | 2.7 | 1.2 | 0.5 | 0.5 | 0.3 | 0.3 | 3.5 | 0.0 | 0.4 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 3.7 | 4.6 | 3.9 | 2.0 | 1.0 | 0.9 | 0.2 | 0.2 | 3.5 | 0.0 | 3.3 |
| **Neonatal mortality rate standard error (SE)** | 2.6 | 2.6 | 1.6 | 0.8 | 0.4 | 0.3 | 0.1 | 0.2 | 3.5 | 0.0 | 0.3 |

| 2006 | <24* | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 28 | 9 | 6 | 7 | 4 | 12 | 7 | 4 | 4 | 6 | 7 |
| **Early neonatal deaths** | 24 | 14 | 7 | 3 | 2 | 6 | 1 | 2 | 0 | 6 | 2 |
| **Late neonatal deaths** | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| **% of deaths[1]** | 16.3 | 8.6 | 5.2 | 3.8 | 2.1 | 6.2 | 2.8 | 2.4 | 1.4 | 4.1 | 3.4 |
| **Live births** | 28 | 30 | 37 | 49 | 37 | 55 | 80 | 91 | 147 | 198 | 283 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 928.6 | 589.7 | 302.3 | 178.6 | 146.3 | 268.7 | 92.0 | 63.2 | 26.5 | 58.8 | 31.0 |
| **Perinatal mortality rate standard error (SE)** | 34.4 | 78.8 | 70.0 | 51.2 | 55.2 | 54.2 | 31.0 | 25.0 | 13.1 | 16.5 | 10.2 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 892.9 | 533.3 | 243.2 | 81.6 | 54.1 | 109.1 | 12.5 | 33.0 | 0.0 | 30.3 | 10.6 |
| **Neonatal mortality rate standard error (SE)** | 58.5 | 91.1 | 70.5 | 39.1 | 37.2 | 42.0 | 12.4 | 18.7 | 0.0 | 12.2 | 6.1 |

| 2006 continued | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | >42 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 9 | 7 | 9 | 16 | 16 | 13 | 9 | 7 | 0 | 0 | 180 |
| **Early neonatal deaths** | 4 | 2 | 3 | 2 | 3 | 6 | 3 | 0 | 0 | 0 | 90 |
| **Late neonatal deaths** | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 2 | 0 | 0 | 20 |
| **% of deaths[1]** | 4.8 | 3.4 | 4.5 | 7.2 | 6.9 | 6.9 | 4.8 | 3.1 | 0.0 | 0.0 | 100.0 |
| **Live births** | 507 | 821 | 1,528 | 3,377 | 7,788 | 11,401 | 11,845 | 6,068 | 216 | 7 | 44,593 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 25.2 | 10.9 | 7.8 | 5.3 | 2.4 | 1.7 | 1.0 | 1.2 | 0.0 | 0.0 | 6.0 |
| **Perinatal mortality rate standard error (SE)** | 6.9 | 3.6 | 2.2 | 1.2 | 0.6 | 0.4 | 0.3 | 0.4 | 0.0 | 0.0 | 0.4 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 9.9 | 3.7 | 2.6 | 1.5 | 0.5 | 0.6 | 0.4 | 0.3 | 0.0 | 0.0 | 2.5 |
| **Neonatal mortality rate standard error (SE)** | 4.4 | 2.1 | 1.3 | 0.7 | 0.3 | 0.2 | 0.2 | 0.2 | 0.0 | 0.0 | 0.2 |

| 2002 to 2006 combined | <24* | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 136 | 32 | 22 | 34 | 27 | 42 | 27 | 37 | 30 | 50 | 30 |
| **Early neonatal deaths** | 156 | 53 | 35 | 26 | 12 | 19 | 11 | 12 | 7 | 10 | 5 |
| **Late neonatal deaths** | 12 | 13 | 11 | 12 | 5 | 1 | 2 | 5 | 1 | 2 | 6 |
| **% of deaths[1]** | 20.2 | 6.5 | 4.5 | 4.8 | 2.9 | 4.1 | 2.7 | 3.6 | 2.5 | 4.1 | 2.7 |
| **Live births** | 169 | 143 | 140 | 216 | 213 | 271 | 317 | 435 | 587 | 941 | 1,250 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 957.4 | 485.7 | 351.9 | 240.0 | 162.5 | 194.9 | 110.5 | 103.8 | 60.0 | 60.5 | 27.3 |
| **Perinatal mortality rate standard error (SE)** | 11.6 | 37.8 | 37.5 | 27.0 | 23.8 | 22.4 | 16.9 | 14.0 | 9.6 | 7.6 | 4.6 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 994.1 | 461.5 | 328.6 | 175.9 | 79.8 | 73.8 | 41.0 | 39.1 | 13.6 | 12.8 | 8.8 |
| **Neonatal mortality rate standard error (SE)** | 5.9 | 41.7 | 39.7 | 25.9 | 18.6 | 15.9 | 11.1 | 9.3 | 4.8 | 3.7 | 2.6 |

| 2002 to 2006 combined continued | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | >42 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Stillbirths** | 38 | 35 | 52 | 71 | 67 | 65 | 60 | 25 | 3 | 1 | 884 |
| **Early neonatal deaths** | 14 | 11 | 23 | 16 | 17 | 28 | 16 | 14 | 1 | 0 | 486 |
| **Late neonatal deaths** | 7 | 3 | 9 | 7 | 12 | 13 | 10 | 6 | 0 | 0 | 137 |
| **% of deaths[1]** | 3.9 | 3.3 | 5.8 | 6.2 | 6.4 | 7.0 | 5.7 | 3.0 | 0.3 | 0.1 | 100.0 |
| **Live births** | 2,331 | 3,552 | 7,323 | 14,546 | 33,840 | 49,354 | 57,630 | 29,389 | 1,630 | 73 | 204,358 |
| **Perinatal mortality rate (per 1,000 total births)[2]** | 22.0 | 12.8 | 10.2 | 6.0 | 2.5 | 1.9 | 1.3 | 1.3 | 2.4 | 13.5 | 6.7 |
| **Perinatal mortality rate standard error (SE)** | 3.0 | 1.9 | 1.2 | 0.6 | 0.3 | 0.2 | 0.2 | 0.2 | 1.2 | 13.4 | 0.2 |
| **Neonatal mortality rate (per 1,000 live births)[3]** | 9.0 | 3.9 | 4.4 | 1.6 | 0.9 | 0.8 | 0.5 | 0.7 | 0.6 | 0.0 | 3.0 |
| **Neonatal mortality rate standard error (SE)** | 2.0 | 1.1 | 0.8 | 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.6 | 0.0 | 0.1 |

**Source:** Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release
Vital Statistics, Birth File, Service Alberta, May 2008 release

**Notes:** 1. % of deaths = (total deaths for a given gestational age) / (total deaths at all gestational ages) x 100
2. ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000
3. ((early neonatal deaths + late neonatal deaths) / live births) x 1000
Total columns include unknown gestational ages
* There may be more deaths than births in this category due to the fact that some live births and stillbirths are inconsistently registered. Total birth numbers are from the Vital Statistics database, in which some births < 500 grams are apparently not registered. The perinatal deaths come from the Medical Records departments which have the death records for these unregistered births. The rates have consequently been adjusted downward to 1,000 where necessary to correct for this fact.
Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.7.2.6 Weight-Specific Perinatal Deaths and Rates by Birth Weight Category (grams), Alberta, 2005, 2006, and 2002 to 2006 Combined

| 2005 | <500* | 500-749 | 750-999 | 1000-1249 | 1250-1499 | 1500-2499 | 2500-4499 | >4499 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Perinatal deaths** | 206 | 91 | 37 | 14 | 18 | 53 | 62 | 2 | 489 |
| **Total births[1]** | 204 | 135 | 125 | 119 | 160 | 2,244 | 38,226 | 683 | 41,896 |
| **Perinatal mortality rate[2] (per 1,000 total births)** | 1000.0 | 674.1 | 296.0 | 117.6 | 112.5 | 23.6 | 1.6 | 2.9 | 11.7 |
| **Standard Error (SE)** | 0.00 | 40.34 | 40.83 | 29.54 | 24.98 | 3.21 | 0.21 | 2.07 | 0.52 |
| **Corrected perinatal mortality rate[3] (per 1,000 total births)** | 1000.0 | 614.0 | 221.2 | 70.8 | 83.9 | 16.6 | 1.4 | 2.9 | 8.4 |
| **Standard Error (SE)** | 0.00 | 45.60 | 39.05 | 24.13 | 22.26 | 2.71 | 0.19 | 2.07 | 0.45 |

| 2006 | <500* | 500-749 | 750-999 | 1000-1249 | 1250-1499 | 1500-2499 | 2500-4499 | >4499 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Perinatal deaths** | 185 | 88 | 27 | 17 | 11 | 50 | 73 | 4 | 461 |
| **Total births[1]** | 180 | 134 | 122 | 111 | 180 | 2,620 | 40,874 | 736 | 44,958 |
| **Perinatal mortality rate[2] (per 1,000 total births)** | 1000.0 | 656.7 | 221.3 | 153.2 | 61.1 | 19.1 | 1.8 | 5.4 | 10.3 |
| **Standard Error (SE)** | 0.00 | 41.02 | 37.58 | 34.18 | 17.85 | 2.67 | 0.21 | 2.71 | 0.48 |
| **Corrected perinatal mortality rate[3] (per 1,000 total births)** | 1000.0 | 600.0 | 181.0 | 121.5 | 39.8 | 13.4 | 1.5 | 5.4 | 7.3 |
| **Standard Error (SE)** | 0.00 | 45.68 | 35.75 | 31.58 | 14.73 | 2.26 | 0.19 | 2.71 | 0.40 |

| 2002 to 2006 Combined | <500* | 500-749 | 750-999 | 1000-1249 | 1250-1499 | 1500-2499 | 2500-4499 | >4499 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Perinatal deaths** | 883 | 405 | 149 | 81 | 72 | 256 | 369 | 26 | 2,260 |
| **Total births[1]** | 844 | 656 | 520 | 575 | 732 | 11,224 | 187,907 | 3,642 | 206,101 |
| **Perinatal mortality rate[2] (per 1,000 total births)** | 1000.0 | 617.4 | 286.5 | 140.9 | 98.4 | 22.8 | 2.0 | 7.1 | 11.0 |
| **Standard Error (SE)** | 0.00 | 18.98 | 19.83 | 14.51 | 11.01 | 1.41 | 0.10 | 1.40 | 0.23 |
| **Corrected perinatal mortality rate[3] (per 1,000 total births)** | 1000.0 | 548.6 | 223.8 | 96.9 | 70.4 | 15.7 | 1.6 | 4.1 | 7.8 |
| **Standard Error (SE)** | 0.00 | 21.10 | 19.07 | 12.65 | 9.60 | 1.18 | 0.09 | 1.06 | 0.19 |

**Source:** Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals, August 2008 release.
Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Stillbirth File, Service Alberta, August 2008 release.

**Notes:** 1. Total births = live births + stillbirths.
2. ((stillbirths + early neonatal deaths) / (stillbirths + live births)) x 1000.
Total columns include unknown weights.
3. Corrected rates exclude deaths due to major congenital anomalies.
* There may be more deaths than births in this category due to the fact that some live births and stillbirths are inconsistently registered. Total birth numbers are from the Vital Statistics database, in which some births < 500 grams are apparently not registered. The perinatal deaths come from the Medical Records departments, which have the death records for these unregistered births. The rates have consequently been adjusted downward to 1,000 where necessary to correct for this fact.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

## 4.7.3 Neonatal Mortality

A neonatal death occurs when an infant is born alive but dies before 28 days of age.

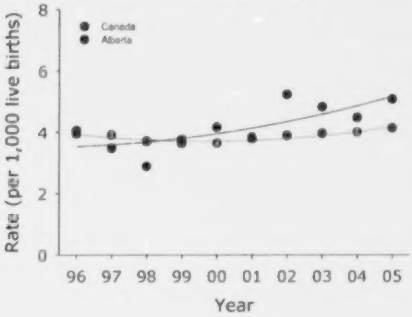
Neonatal mortality rate: Number of neonatal deaths per 1,000 live births in a given year.

The leading causes of neonatal death in Canada in 1999 were immaturity (32.6% of neonatal deaths), congenital anomalies (28.5%), and asphyxia (14.7%; Health Canada, 2003). Risk factors for neonatal mortality are similar to those for perinatal mortality.

With the exception of 2002, Albertan and Canadian neonatal mortality rates did not differ significantly between 1996 and 2005. In 2005, the neonatal mortality rate was 5.1 (per 1,000 live births) in Alberta and 4.1 in Canada (Statistics Canada, 2008c, d). Registration of live births under 500 grams has been routine in Alberta since 1990, elevating the perinatal, neonatal, and infant mortality rates in Alberta relative to the rest of Canada, where such births are not universally registered.

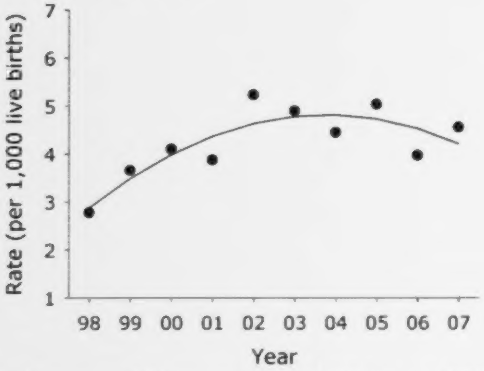
Neonatal Mortality Rate, Alberta and Canada, 1996 to 2005

Source: Statistics Canada (1999a,b, 2002, 2008c,d)



## Time Trends (see Table 4.7.3.1)

Neonatal Mortality Rate, Alberta, 1998 to 2007



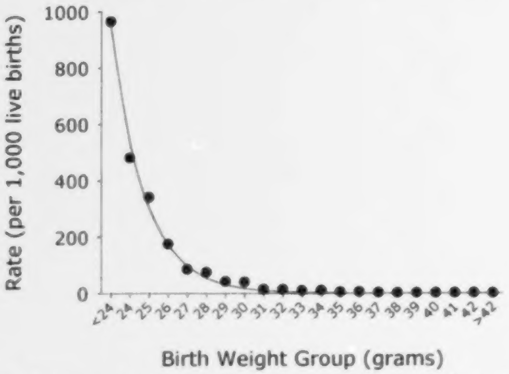
- In 2007, there were 220 neonatal deaths (4.6 per 1,000 live births). The neonatal mortality rate (per 1,000 live births) was generally stable between 2002 and 2007.

## Maternal Age Effects (see Tables 4.7.2.2, 4.7.2.3)

- The number of neonatal deaths in 2005 and 2006 was too small for reliable comparisons between age groups.

## Gestational Age Effects (see Tables 4.7.2.4, 4.7.2.5)

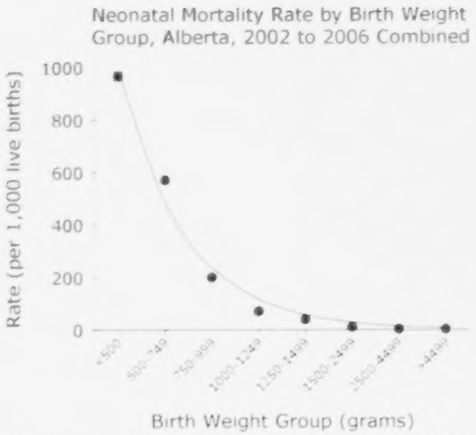
Neonatal Mortality Rate by Birth Weight Group, Alberta, 2002 to 2006 Combined



- Neonatal deaths also decrease exponentially with increasing gestational age.
- For 2002 to 2006 combined, more than 96% of all babies born alive prior to 24 weeks gestation died before 28 days of life. For infants born at or after 27 weeks gestation, the neonatal mortality rate was less than one tenth of this rate. At 40 weeks gestation, the rate was at its lowest level (0.5 per 1,000 live births).

# 4.7.3 Neonatal Mortality

## Birth Weight Effects (see Table 4.7.3.3)

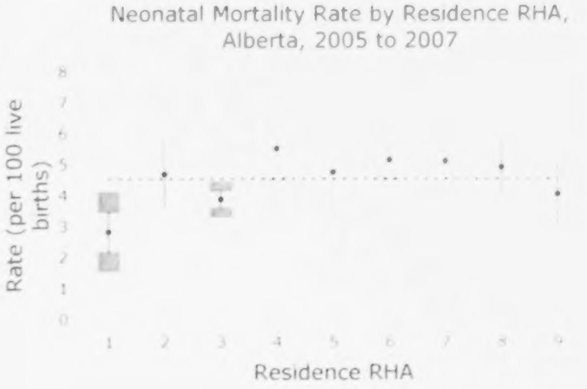


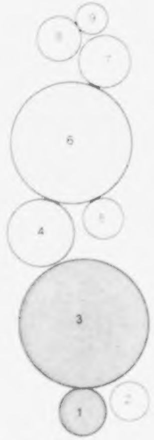
- Neonatal mortality rates decrease exponentially with increasing birth weight. For 2002 to 2006 combined, the neonatal mortality rate ranged from 964.8 (per 1,000 live births) for births under 500 grams to less than 1.0 for births between of 2,500 grams or more.

## Congenital Anomalies (see Tables 4.7.1.7, 4.7.1.8)

- For 2002to 2006 combined, 29.2% of neonatal deaths due to major anomalies were due to chromosomal anomalies, more than any other type of anomaly.

## Regional Data (see Table 4.7.3.2)

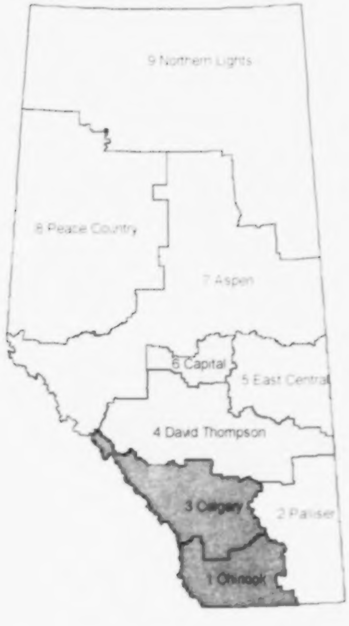




- The neonatal mortality rate was significantly lower than the provincial average in RHAs 1 and 3 between 2005 and 2007. RHA 1 had the lowest rate (2.8 per 1,000 live births).

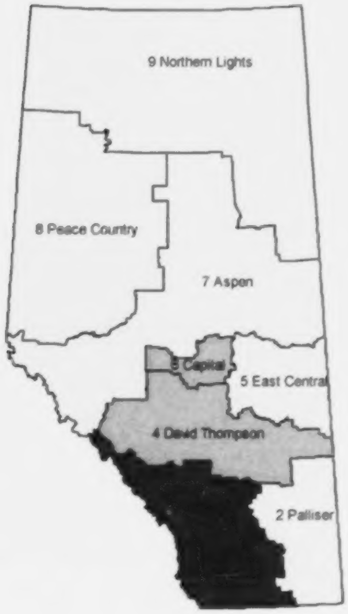
See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Neonatal Mortality Rate, 1997-2006
Combined

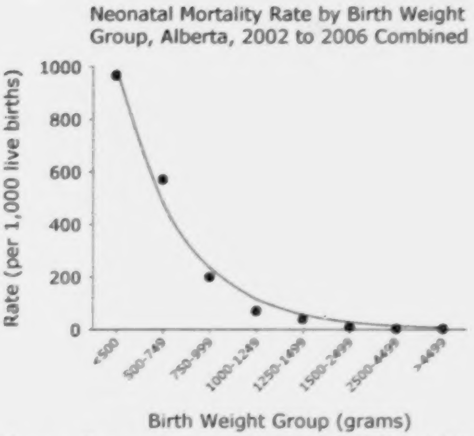

9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

# 4.7.3 Neonatal Mortality

Neonatal Mortality Rate, 1997-2006 Combined



## Birth Weight Effects (see Table 4.7.3.3)

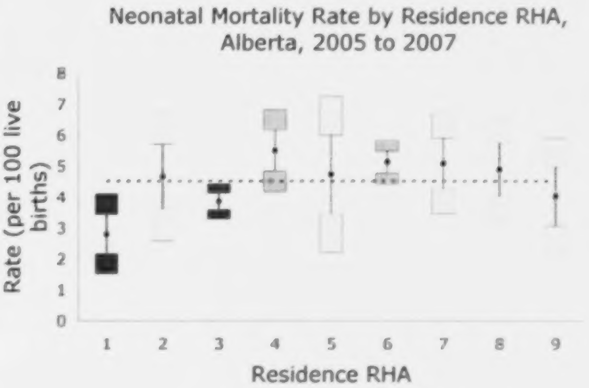

Neonatal Mortality Rate by Birth Weight Group, Alberta, 2002 to 2006 Combined

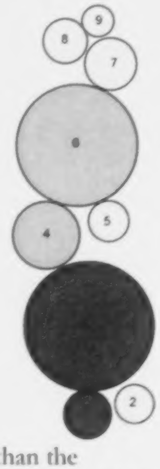
- Neonatal mortality rates decrease exponentially with increasing birth weight. For 2002 to 2006 combined, the neonatal mortality rate ranged from 964.8 (per 1,000 live births) for births under 500 grams to less than 1.0 for births between of 2,500 grams or more.

## Congenital Anomalies (see Tables 4.7.1.7, 4.7.1.8)

- For 2002to 2006 combined, 29.2% of neonatal deaths due to major anomalies were due to chromosomal anomalies, more than any other type of anomaly.

## Regional Data (see Table 4.7.3.2)


Neonatal Mortality Rate by Residence RHA, Alberta, 2005 to 2007



- The neonatal mortality rate was significantly lower than the provincial average in RHAs 1 and 3 between 2005 and 2007. RHA 1 had the lowest rate (2.8 per 1,000 live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

## 4.7.3 Neonatal Mortality

### Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Neonatal mortality rates must be interpreted with caution due to the low number of cases in many categories.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

## Table 4.7.3.1 Neonatal Deaths and Rate, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Neonatal deaths** | 104 | 138 | 150 | 144 | 200 | 195 | 179 | 209 | 177 | 220 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 1,000 live births)** | 2.8 | 3.7 | 4.1 | 3.9 | 5.2 | 4.9 | 4.4 | 5.0 | 4.0 | 4.6 |
| **Standard Error (SE)** | 0.27 | 0.31 | 0.33 | 0.32 | 0.37 | 0.35 | 0.33 | 0.35 | 0.30 | 0.31 |

## Table 4.7.3.2 Neonatal Deaths and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Neonatal deaths** | 19 | 20 | 191 | 69 | 14 | 203 | 39 | 33 | 18 | 607 |
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,601 |
| **Rate (per 1,000 live births)** | 2.8 | 4.7 | 3.9 | 5.5 | 4.7 | 5.1 | 5.1 | 4.9 | 4.0 | 4.5 |
| **Standard Error (SE)** | 0.64 | 1.04 | 0.28 | 0.66 | 1.26 | 0.36 | 0.81 | 0.85 | 0.95 | 0.18 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Death File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.
Totals for RHAs include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

## Table 4.7.3.3 Weight-Specific Neonatal Deaths and Rates by Birth Weight Category (grams), Alberta, 2005, 2006, and 2004 to 2006 Combined

| 2005 | <500* | 500-749 | 750-999 | 1000-1249 | 1250-1499 | 1500-2499 | 2500-4499 | >4499 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Neonatal deaths** | 70 | 56 | 23 | 9 | 5 | 18 | 24 | 0 | 205 |
| **Live births** | 71 | 92 | 103 | 112 | 144 | 2,206 | 38,178 | 681 | 41,587 |
| **Neonatal mortality rate[1] (per 1,000 total births)** | 985.9 | 608.7 | 223.3 | 80.4 | 34.7 | 8.2 | 0.6 | 0.0 | 4.9 |
| **Standard Error (SE)** | 13.98 | 50.88 | 41.03 | 25.69 | 15.26 | 1.92 | 0.13 | 0.00 | 0.34 |
| **Corrected Neonatal mortality rate[2] (per 1,000 total births)** | 979.2 | 571.4 | 207.9 | 46.3 | 28.0 | 2.7 | 0.3 | 0.0 | 3.5 |
| **Standard Error (SE)** | 20.62 | 53.99 | 40.38 | 20.22 | 13.79 | 1.11 | 0.09 | 0.00 | 0.29 |

| 2006 | <500* | 500-749 | 750-999 | 1000-1249 | 1250-1499 | 1500-2499 | 2500-4499 | >4499 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Neonatal deaths** | 61 | 44 | 17 | 6 | 5 | 12 | 26 | 0 | 172 |
| **Live births** | 66 | 79 | 110 | 100 | 173 | 2,581 | 40,817 | 733 | 44,659 |
| **Neonatal mortality rate[1] (per 1,000 total births)** | 924.2 | 557.0 | 154.5 | 60.0 | 28.9 | 4.6 | 0.6 | 0.0 | 3.9 |
| **Standard Error (SE)** | 0.00 | 55.89 | 34.46 | 23.75 | 12.74 | 1.34 | 0.12 | 0.00 | 0.29 |
| **Corrected Neonatal mortality rate[2] (per 1,000 total births)** | 891.3 | 520.5 | 122.6 | 30.9 | 17.5 | 0.8 | 0.3 | 0.0 | 2.5 |
| **Standard Error (SE)** | 0.00 | 58.47 | 31.86 | 17.58 | 10.04 | 0.55 | 0.08 | 0.00 | 0.24 |

| 2002 to 2006 Combined | <500* | 500-749 | 750-999 | 1000-1249 | 1250-1499 | 1500-2499 | 2500-4499 | >4499 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Neonatal deaths** | 329 | 234 | 87 | 36 | 26 | 88 | 138 | 2 | 941 |
| **Live births** | 341 | 411 | 439 | 525 | 677 | 11,036 | 187,638 | 3,632 | 204,699 |
| **Neonatal mortality rate[1] (per 1,000 total births)** | 964.8 | 569.3 | 198.2 | 68.6 | 38.4 | 8.0 | 0.7 | 0.6 | 4.6 |
| **Standard Error (SE)** | 9.98 | 24.42 | 19.03 | 11.03 | 7.39 | 0.85 | 0.06 | 0.39 | 0.15 |
| **Corrected Neonatal mortality rate[2] (per 1,000 total births)** | 947.8 | 529.3 | 169.8 | 39.3 | 19.6 | 1.7 | 0.3 | 0.6 | 3.0 |
| **Standard Error (SE)** | 0.00 | 25.74 | 18.23 | 8.61 | 5.38 | 0.40 | 0.04 | 0.39 | 0.12 |

**Source:** Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals. August 2008 release.
Vital Statistics, Birth File, Service Alberta, May 2008 release.

**Notes:** 1. (neonatal deaths / live births) x 1000
2. Corrected rates exclude deaths due to major congenital anomalies.
* There may be more deaths than births in this category due to the fact that some live births and stillbirths are inconsistently registered. Total birth numbers are from the Vital Statistics database, in which some births < 500 grams are apparently not registered. The Neonatal deaths come from the Medical Records departments which have the death records for these unregistered births. The rates have consequently been adjusted downward to 1,000 where necessary to correct for this fact.
Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

# 4.7.4 Post-neonatal Mortality

A post-neonatal death *occurs when an infant is born alive but dies between 28 days and one year of age.*

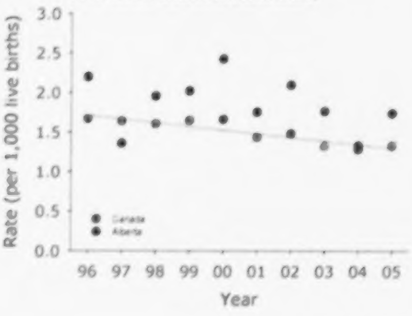
Post-neonatal mortality rate: Number of post-neonatal deaths per 1,000 live births in a given year.

Socioeconomic factors play a role in post-neonatal death rates in Canada. The rate of post-neonatal death was more than five times higher among low income women than among high income women in one large study. Behavioural and lifestyle factors (e.g., smoking, pre-pregnancy weight, maternal age) accounted for these differences (Joseph, Liston, Dodds, Dahlgren, and Allen, 2007). Sudden infant death syndrome and congenital anomalies are the leading causes of post-neonatal death in Canada (Health Canada, 2003).

Between 1990 and 2005, post-neonatal mortality rates declined in Canada as a whole; the rate in Alberta showed no time trend. In 2005, the post-neonatal mortality rate was 1.7 (per 1,000 live births) in Alberta and 1.3 in Canada (Statistics Canada, 2008c, d).

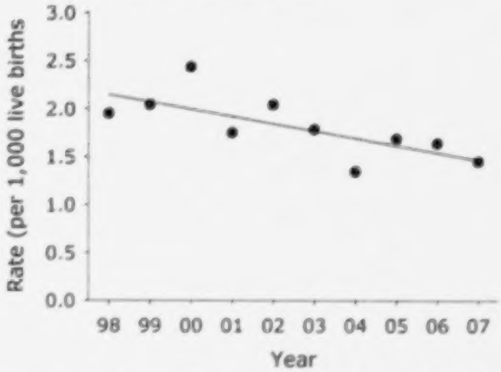
Post-Neonatal Mortality Rate, Alberta and Canada, 1996 to 2005

Source: Statistics Canada (1999a,b, 2002, 2008c,d)



## Time Trends (see Table 4.7.4.1)

Post-neonatal Mortality Rate, Alberta, 1998 to 2007



- The post-neonatal mortality rate declined over time, from 1.9 (per 1,000 live births) in 1998 to 1.4 in 2007. There were 70 post-neonatal deaths in Alberta in 2007.

## Regional Data (see Table 4.7.4.2)

- Post-neonatal mortality rates by residence RHA for 2003 to 2005 combined are in Table 4.7.4.2. The number of cases is too small to make reliable inter-regional comparisons.

### Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Post-neonatal mortality rates must be interpreted with caution due to the low number of cases in many categories.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.7.4.1 Post-neonatal Deaths and Rate, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Post-neonatal deaths** | 73 | 77 | 89 | 65 | 78 | 71 | 54 | 70 | 73 | 70 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 1,000 live births)** | 1.9 | 2.0 | 2.4 | 1.7 | 2.0 | 1.8 | 1.3 | 1.7 | 1.6 | 1.4 |
| **Standard Error (SE)** | 0.23 | 0.23 | 0.26 | 0.22 | 0.23 | 0.21 | 0.18 | 0.20 | 0.19 | 0.17 |

Table 4.7.4.2 Post-neonatal Deaths and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Post-neonatal deaths** | 8 | 8 | 72 | 29 | 3 | 57 | 18 | 12 | 6 | 213 |
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,601 |
| **Rate (per 1,000 live births)** | 1.2 | 1.9 | 1.5 | 2.3 | 1.0 | 1.4 | 2.3 | 1.8 | 1.3 | 1.6 |
| **Standard Error (SE)** | 0.42 | 0.66 | 0.17 | 0.43 | 0.59 | 0.19 | 0.55 | 0.51 | 0.55 | 0.11 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release
Vital Statistics, Death File, Service Alberta, May 2008 release

**Notes:** Data include Alberta residents only.
Totals for RHAs include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

## 4.7.5 Infant Mortality

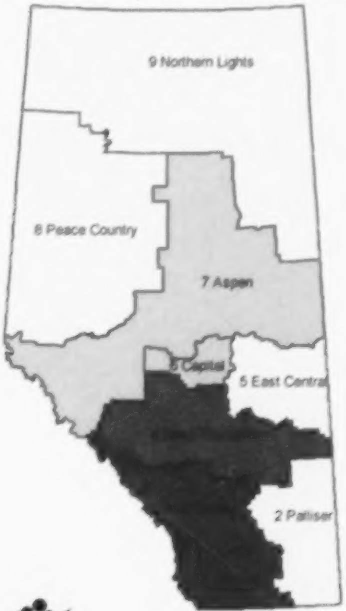
An infant mortality *occurs when an infant dies before reaching 12 months of age.* This includes neonatal and post-neonatal deaths.

Infant mortality rate: *Number of infant deaths per 1,000 live births.*

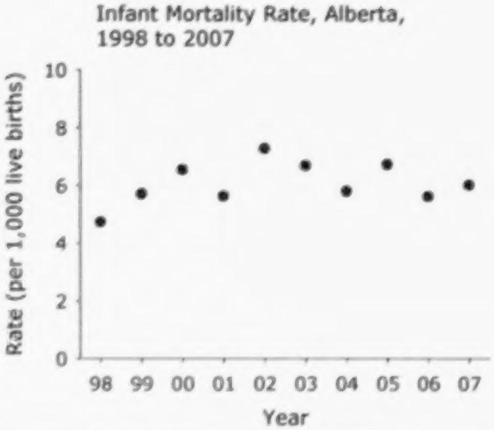
Most infant deaths are preterm or low birth weight or both. Other risk factors include maternal smoking, low maternal education, low or high maternal age, and male gender (Chen et al., 1998; Nault, 1997; Pollack, Lantz, and Frohna, 2000).

The leading causes of infant mortality in Alberta for 1998 to 2003 combined were perinatal conditions (e.g., pregnancy and birth complications, birth injury, respiratory problems, infection, etc., 41.5% of deaths), congenital anomalies (28.0% of deaths) and Sudden Infant Death Syndrome (11.8% of deaths; Child Health Surveillance Project Data Group, 2005).

**Infant Mortality Rate, 2005-07 Combined**

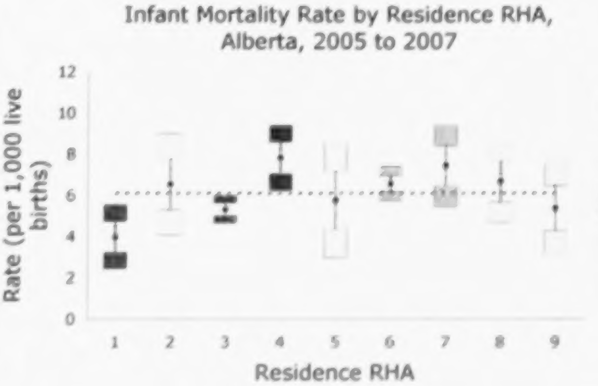


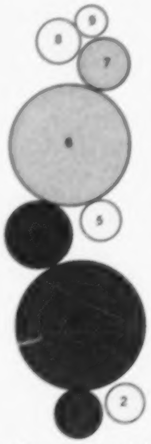
### Time Trends (see Tables 4.7.5.1, 4.7.5.2)



- The infant mortality rate did not vary significantly with time between 1998 and 2007. In 2007, there were 290 infant deaths in Alberta, resulting in a rate of 6.0 (per 1,000 live births).
- Generally, the infant mortality rate was slightly higher for males than for females.

### Regional Data (see Tables 4.7.5.3, 4.7.5.4)





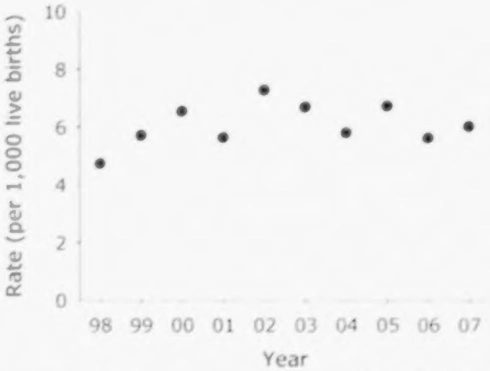
- The infant mortality rate was significantly lower than the provincial average in RHAs 1 and 3 between 2005 and 2007, with the lowest rate in RHA 1 (4.0 per 1,000 live births).
- The rate was higher than the provincial average in RHA 4 (7.8 per 1,000 live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

# 4.7.5 Infant Mortality

## Time Trends (see Tables 4.7.5.1, 4.7.5.2)

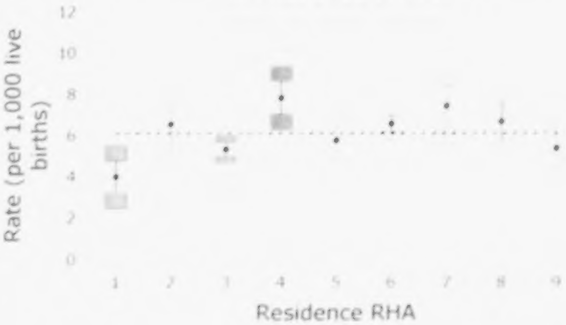
Infant Mortality Rate, Alberta, 1998 to 2007

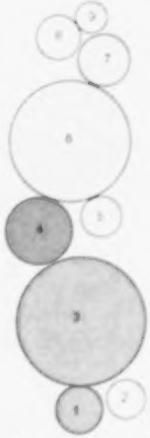


- The infant mortality rate did not vary significantly with time between 1998 and 2007. In 2007, there were 290 infant deaths in Alberta, resulting in a rate of 6.0 (per 1,000 live births).
- Generally, the infant mortality rate was slightly higher for males than for females.

## Regional Data (see Tables 4.7.5.3, 4.7.5.4)

Infant Mortality Rate by Residence RHA, Alberta, 2005 to 2007

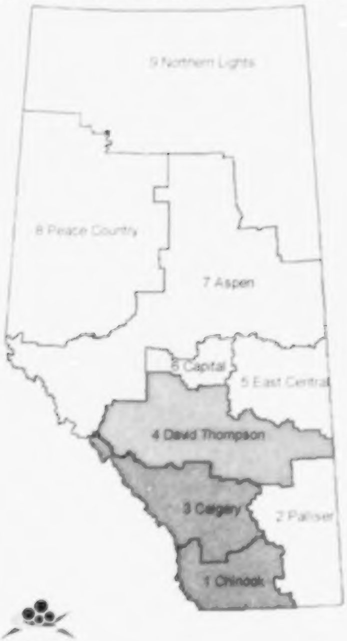




- The infant mortality rate was significantly lower than the provincial average in RHAs 1 and 3 between 2005 and 2007, with the lowest rate in RHA 1 (4.0 per 1,000 live births).
- The rate was higher than the provincial average in RHA 4 (7.8 per 1,000 live births).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

Infant Mortality Rate, 2005-07 Combined


9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

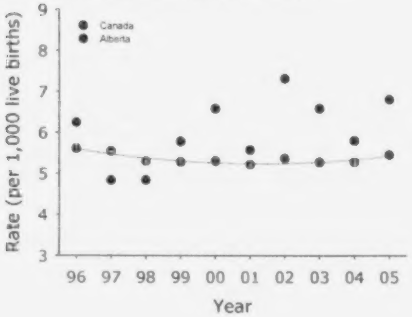
## 4.7.5 Infant Mortality

Throughout the world, infant mortality declined dramatically in the 1900s. In Canada, the rate has stabilized in recent years, but regional variation persists due to variability in demographics, quality of obstetric and infant care, and differences in registration practices (Wen, Kramer, Liu, Dzakpasu, & Sauvé, 2000). While mortality rates have declined, morbidity rates have increased. Much perinatal and infant research is directed toward preventing or reducing long term morbidity in preterm and low birth weight infants (Saigal and Doyle, 2008).

Canadian infant mortality rates declined slightly in the late 1990s, while Albertan infant mortality rates did not vary significantly with time between 1996 and 2005. In 2005, the infant mortality rate was 6.8 (per 1,000 live births) in Alberta and 5.4 in Canada (Statistics Canada, 2008d). Registration of live births under 500 grams has been routine in Alberta since 1990, elevating the perinatal, neonatal, and infant mortality rates in Alberta relative to the rest of Canada, where such births are not universally registered.

Infant Mortality Rate,
Alberta and Canada, 1996 to 2005

Source: Statistics Canada (1999a,b, 2002, 2008c,d)



### Limitations and Methodology Notes

See Appendix 6.2.1 for comparative mortality definitions.

Infant mortality rates must be interpreted with caution due to the low number of cases in many categories.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

## Table 4.7.5.1 Infant Deaths and Rate by Year, Alberta, 1998 to 2007

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Infant Deaths** | 177 | 215 | 239 | 209 | 278 | 266 | 233 | 279 | 250 | 290 |
| **Live births** | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 | 48,348 |
| **Rate (per 1,000 live births)** | 4.7 | 5.7 | 6.5 | 5.6 | 7.3 | 6.7 | 5.8 | 6.7 | 5.6 | 6.0 |
| **Standard Error (SE)** | 0.35 | 0.39 | 0.42 | 0.39 | 0.43 | 0.41 | 0.38 | 0.40 | 0.35 | 0.35 |

## Table 4.7.5.2 Infant Deaths and Rate by Sex, Alberta, 1998 to 2007

| Female | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Infant Deaths** | 73 | 100 | 100 | 81 | 133 | 108 | 104 | 118 | 110 | 142 |
| **Live births** | 18,234 | 18,547 | 18,009 | 18,116 | 18,709 | 19,455 | 19,624 | 20,344 | 21,802 | 23,751 |
| **Rate (per 1,000 live births)** | 4.0 | 5.4 | 5.6 | 4.5 | 7.1 | 5.6 | 5.3 | 5.8 | 5.0 | 6.0 |
| **Standard Error (SE)** | 0.47 | 0.54 | 0.55 | 0.50 | 0.61 | 0.53 | 0.52 | 0.53 | 0.48 | 0.50 |

| Male | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Infant Deaths** | 104 | 115 | 139 | 128 | 145 | 157 | 128 | 161 | 140 | 148 |
| **Live births** | 19,295 | 19,231 | 18,616 | 19,110 | 19,584 | 20,412 | 20,667 | 21,243 | 22,857 | 24,597 |
| **Rate (per 1,000 live births)** | 5.4 | 6.0 | 7.5 | 6.7 | 7.4 | 7.7 | 6.2 | 7.6 | 6.1 | 6.0 |
| **Standard Error (SE)** | 0.53 | 0.56 | 0.63 | 0.59 | 0.61 | 0.61 | 0.55 | 0.60 | 0.52 | 0.49 |

## Table 4.7.5.3 Infant Deaths and Rate by Residence RHA, Alberta, 2005 to 2007 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Infant Deaths** | 27 | 28 | 263 | 98 | 17 | 260 | 57 | 45 | 24 | 820 |
| **Live births** | 6,771 | 4,289 | 49,489 | 12,556 | 2,959 | 39,635 | 7,674 | 6,750 | 4,471 | 134,601 |
| **Rate (per 1,000 live births)** | 4.0 | 6.5 | 5.3 | 7.8 | 5.7 | 6.6 | 7.4 | 6.7 | 5.4 | 6.1 |
| **Standard Error (SE)** | 0.77 | 1.23 | 0.33 | 0.79 | 1.39 | 0.41 | 0.98 | 0.99 | 1.09 | 0.21 |

**Source:** Vital Statistics, Birth File, Service Alberta, May 2008 release.
Vital Statistics, Death File, Service Alberta, May 2008 release.

**Notes:** Data include Alberta residents only.
Totals for RHAs include unknown RHAs.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

## Table 4.7.5.4 Infant Deaths by Year and Residence RHA, Alberta, 1998 to 2007

| Infant deaths | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 8 | 11 | 13 | 18 | 13 | 16 | 7 | 6 | 12 | 9 |
| Palliser | 11 | 3 | 3 | 8 | 11 | 12 | 6 | 8 | 9 | 11 |
| Calgary | 49 | 70 | 70 | 62 | 96 | 79 | 60 | 94 | 72 | 97 |
| David Thompson | 17 | 23 | 23 | 22 | 28 | 32 | 24 | 31 | 28 | 39 |
| East Central | 4 | 4 | 3 | 5 | 14 | 16 | 7 | 9 | 4 | 4 |
| Capital | 52 | 68 | 79 | 72 | 56 | 77 | 87 | 90 | 77 | 93 |
| Aspen | 10 | 20 | 23 | 11 | 28 | 15 | 25 | 22 | 16 | 19 |
| Peace Country | 10 | 9 | 15 | 6 | 15 | 9 | 10 | 10 | 24 | 11 |
| Northern Lights | 14 | 4 | 10 | 5 | 15 | 10 | 6 | 9 | 8 | 7 |
| Alberta | 177 | 215 | 239 | 209 | 278 | 266 | 233 | 279 | 250 | 290 |

**Source:** Vital Statistics, Death File, Service Alberta, May 2008 release.

**Notes:** Number of infant deaths is too low to provide rates in many cells.

**Notes:** Data include Alberta residents only.
Data may differ from previously published data due to differences in definitions and dates of data extraction.

## 4.7.6 Maternal Mortality

The Alberta Perinatal Health Program reviews reported maternal deaths that occur during pregnancy and up to 90 days post delivery. These deaths are classified according to the Council on Medical Service, American Medical Association, Committee on Maternal and Child Care (1964). This classification includes three categories:

Direct obstetric deaths: *Maternal deaths resulting from obstetric complications of pregnancy, labour, or puerperium, or from interventions, omissions, incorrect treatment or from a chain of events resulting from any of the above.*

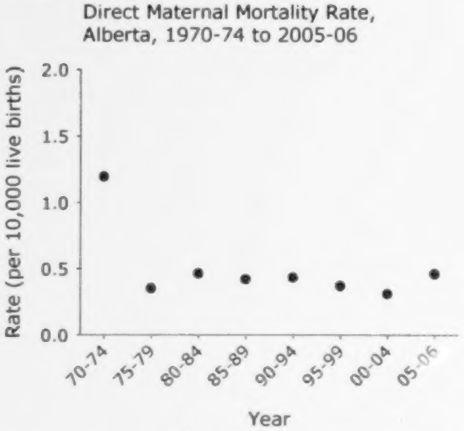
Indirect obstetric deaths: *Maternal deaths resulting from previously existing disease or disease that developed during pregnancy, not directly due to obstetric causes, but which was aggravated by [illegible]*

Unrelated deaths: *Maternal deaths from causes not related to pregnancy or [illegible]*. These deaths are not reported here.

Maternal mortality rate: *Number of maternal deaths per 10,000 [illegible] and unrelated deaths.*

Maternal mortality rates are used worldwide as an indicator of the status of women, their ability to access care, and the ability of health care systems to provide care. More than one half million maternal deaths occur across the world each year; two-thirds of these deaths occur in just 13 countries. Canada's maternal mortality rate is one of the lowest in the world, but risk varies across sub-populations of women. (Health Canada, 2004).

## Time Trends (see Table 4.7.6.1)



- The direct maternal mortality rate for five-year periods, and for 2005-06, is shown in the figure above. The rate for 1970-74 was higher than for later years. The rate has been stable since 1975-79.
- Between 2000 and 2006, there were 10 direct and 7 indirect maternal deaths in Alberta out of a total of 281,848 live births. Maternal deaths are extremely rare in Alberta.
- In 2006, there were three direct maternal deaths. There were no indirect maternal deaths in Alberta in 2006.

### Limitations and Methodology Notes

Maternal mortality rates must be interpreted with caution due to the low number of cases in many categories.

# 4.7.6 Maternal Mortality

The risk of maternal death is higher for older mothers, in particular mothers over 40 years of age, regardless of parity, prenatal care, or education. Causes of death associated with increased maternal age include placental abnormalities and hypertensive disorders (Callaghan & Berg, 2003).

The most common causes of direct maternal mortality from 1997 to 2000 in Canada were pulmonary embolism and pre-eclampsia/pregnancy induced hypertension. Cardiovascular disease accounted for 60% of indirect maternal deaths between 1997 and 2000. The most common cause of maternal death unrelated to pregnancy was motor vehicle collisions, accounting for 50% of unrelated maternal deaths (Health Canada, 2004).

Between 1997 and 2000, there were 64 maternal deaths in Canada, 44 direct and 20 indirect. The overall maternal mortality rate was 6.1 (per 100,000 live births), with direct and indirect rate of 4.2 and 1.9, respectively. About three quarters of maternal deaths occurred at 24 weeks' gestation or later, with almost half of these deaths occurring in the post-partum period (Health Canada, 2004).

Table 4.7.6.1 Maternal Deaths and Rates by Cause, Alberta, 1970 to 2006

| | Deaths | | | | Rates (per 10,000 live births) | | |
|---|---|---|---|---|---|---|---|
| | Direct | Indirect | Total (Direct + Indirect) | Unrelated | Direct | Indirect | Total (Direct + Indirect) |
| **1970** | 4 | 1 | 5 | 6 | 1.3 | 0.3 | 1.6 |
| **1971** | 3 | 2 | 5 | 8 | 1.0 | 0.7 | 1.6 |
| **1972** | 5 | 0 | 5 | 5 | 1.7 | 0.0 | 1.7 |
| **1973** | 5 | 2 | 7 | 10 | 1.7 | 0.7 | 2.4 |
| **1974** | 1 | 1 | 2 | 3 | 0.3 | 0.3 | 0.7 |
| **1975** | 1 | 2 | 3 | 3 | 0.3 | 0.6 | 0.9 |
| **1976** | 1 | 1 | 2 | 2 | 0.3 | 0.3 | 0.6 |
| **1977** | 1 | 4 | 5 | 4 | 0.3 | 1.2 | 1.5 |
| **1978** | 1 | 2 | 3 | 2 | 0.3 | 0.6 | 0.8 |
| **1979** | 2 | 1 | 3 | 6 | 0.5 | 0.3 | 0.8 |
| **1980** | 2 | 1 | 3 | 0 | 0.5 | 0.3 | 0.8 |
| **1981** | 2 | 4 | 6 | 2 | 0.5 | 0.9 | 1.4 |
| **1982** | 1 | 4 | 5 | 4 | 0.2 | 0.9 | 1.1 |
| **1983** | 5 | 1 | 6 | 2 | 1.1 | 0.2 | 1.3 |
| **1984** | 0 | 1 | 1 | 4 | 0.0 | 0.2 | 0.2 |
| **1985** | 2 | 0 | 2 | 6 | 0.5 | 0.0 | 0.5 |
| **1986** | 0 | 0 | 0 | 7 | 0.0 | 0.0 | 0.0 |
| **1987** | 0 | 0 | 0 | 7 | 0.0 | 0.0 | 0.0 |
| **1988** | 4 | 3 | 7 | 6 | 1.0 | 0.7 | 1.7 |
| **1989** | 3 | 2 | 5 | 2 | 0.7 | 0.5 | 1.2 |
| **1990** | 3 | 0 | 3 | 3 | 0.7 | 0.0 | 0.7 |
| **1991** | 1 | 3 | 4 | 1 | 0.2 | 0.7 | 0.9 |
| **1992** | 2 | 3 | 5 | 1 | 0.5 | 0.7 | 1.2 |
| **1993** | 1 | 1 | 2 | 2 | 0.2 | 0.2 | 0.5 |
| **1994** | 2 | 0 | 2 | 1 | 0.5 | 0.0 | 0.5 |
| **1995** | 2 | 2 | 4 | 0 | 0.5 | 0.5 | 1.0 |
| **1996** | 2 | 2 | 4 | 2 | 0.5 | 0.5 | 1.1 |
| **1997** | 1 | 0 | 1 | 0 | 0.3 | 0.0 | 0.3 |
| **1998** | 2 | 5 | 7 | 1 | 0.5 | 1.3 | 1.8 |
| **1999** | 0 | 0 | 0 | 1 | 0.0 | 0.0 | 0.0 |
| **2000** | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 |
| **2001** | 2 | 1 | 3 | 1 | 0.5 | 0.3 | 0.8 |
| **2002** | 1 | 0 | 1 | 5 | 0.3 | 0.0 | 0.3 |
| **2003** | 2 | 1 | 3 | 6 | 0.5 | 0.2 | 0.7 |
| **2004** | 1 | 1 | 2 | 0 | 0.2 | 0.2 | 0.5 |
| **2005** | 1 | 4 | 5 | 6 | 0.2 | 1.0 | 1.2 |
| **2006** | 3 | 0 | 3 | 2 | 0.7 | 0.0 | 0.7 |

**Source:** Statistics reported to the Alberta Perinatal Health Program by Medical Records Departments of the hospitals
Vital Statistics, Birth Files, Service Alberta

**Notes:** Data include non-Alberta residents who died in Alberta
Data may differ from previously published data due to differences in definitions and dates of data extraction

# 4. Births

## *4.8 Maternal factors*

*4.8.1 Maternal postnatal morbidity*
*4.8.2 Breastfeeding*

# 4.8.1 Maternal Postnatal Morbidity

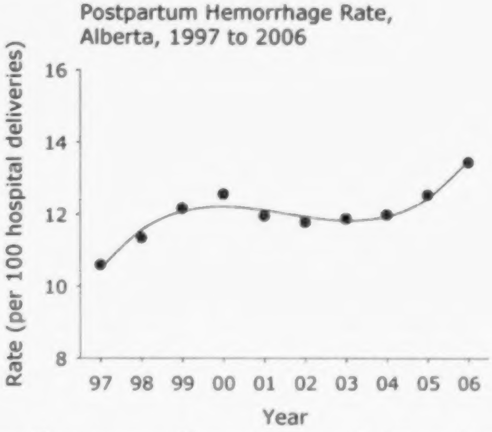
Postpartum hemorrhage: *Excessive blood loss after childbirth. May occur immediately after delivery or may be delayed by days or weeks* (Morgan, 1990). Early postpartum hemorrhage *occurs within 24 hours of giving birth*, while late postpartum hemorrhage *occurs more than 24 hours after giving birth*. Overall postpartum hemorrhage [illegible]. For the data presented here, postpartum hemorrhage was defined as loss of more than 500 ml of blood after vaginal delivery or loss of more than 1000 ml of blood after cesarean section.

Depression: [illegible] (Dorland, 2000).

Postpartum depression: *In the analysis* [illegible].

Rates for the postpartum hemorrhage and postpartum depression are per 100 hospital deliveries.

## Time Trends (see Tables 4.8.1.1, 4.8.1.4)


Postpartum Hemorrhage Rate, Alberta, 1997 to 2006

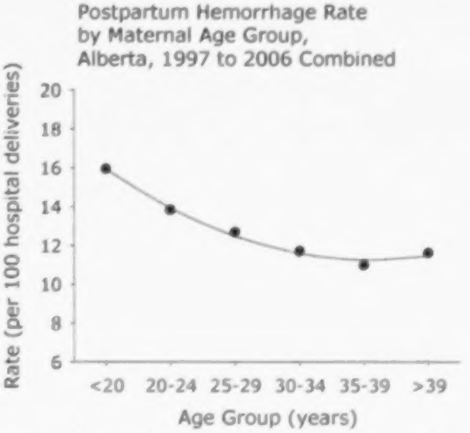
- The overall postpartum hemorrhage rate in Alberta increased in the late 1990s, decreased slightly in 2001, stabilized, and then increased in 2005 and 2006. In 2006, the postpartum hemorrhage rate was 13.4.
- In 2005 and 2006, the rate of early postpartum hemorrhage but not late postpartum hemorrhage increased. In 2006, the early rate was 8.6 (per 100 live births), and the late rate was 2.3.
- Between 2002 and 2006, the rates of prenatal and postpartum depression did not vary significantly with time.
- In 2006, the rate of prenatal depression was 2.7 (per 100 hospital deliveries); depression one month following delivery occurred in 2.0% of deliveries.
- The rate of postpartum depression up to 6 months after delivery was 6.8 in 2006; this rate increased to 10.0 and 12.2 at 12 and 24 months after delivery, respectively.
- In summary, in the 12 months following delivery, almost four times as many women (10.0%) were diagnosed with depression as were diagnosed in the prenatal period (2.7%).

# 4.8.1 Maternal Postnatal Morbidity

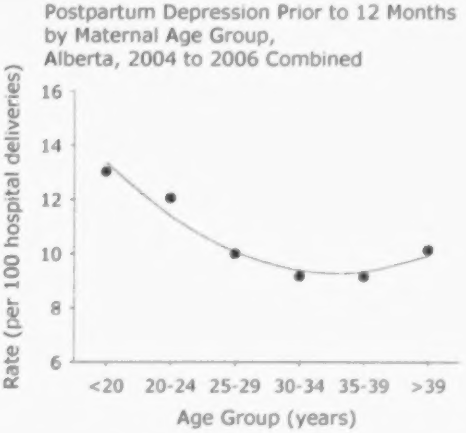
Postpartum hemorrhage is the leading cause of maternal death worldwide, and is a leading cause of serious maternal morbidity. Ability to recover from blood loss depends on many factors, including overall health, presence of anemia, and presence of complicating factors such as dehydration or preeclampsia (Ramanathan and Arulkumaran, 2006). There are recent increasing trends in rates of postpartum hemorrhage and postpartum hemorrhage with hysterectomy in Canada. Reasons for the rate increase are unclear (Joseph, Rouleau, Kramer, et al., 2007). Risk factors for postpartum hemorrhage include prolonged third stage of labour, preeclampsia, episiotomy, previous postpartum hemorrhage, and multiple pregnancy (Magann, Hem, and Galazka, 2006).

Postpartum depression can affect the health of the mother, her infant, and other family members. Postpartum depressive disorders range from mild "blues" to non-psychotic major depression to psychosis, and affect 10 to 15% of mothers (Munk-Olsen, Laursen, Pedersen, Mors, and Mortensen, 2006). Predictors of postpartum depression include prenatal depression, low self-esteem, childcare stress, and prenatal anxiety (Beck, 2001). Limited social support and teenage pregnancy have also been implicated (O'Hara & Swain, 1996). Hormonal and other biologic factors are thought to play an important role (Miller, 2002).

## Maternal Age Effects (see Tables 4.8.1.2, 4.8.1.5)


Postpartum Hemorrhage Rate by Maternal Age Group, Alberta, 1997 to 2006 Combined

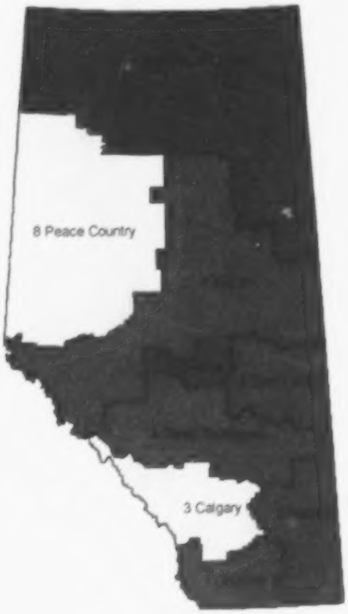
- Postpartum hemorrhage was most likely in mothers under 20, and declined with increasing maternal age for women under 40. Between 1997 and 2006, 15.9% of live births to women under 20 involved postpartum hemorrhage, compared with 11.0% for women 35 to 39.


Postpartum Depression Prior to 12 Months by Maternal Age Group, Alberta, 2004 to 2006 Combined

- Prior to delivery, depression diagnoses do not vary with maternal age. After delivery, teen mothers consistently have the highest rates of postpartum depression, and mothers over 40 tend to have slightly elevated rates compared to younger mothers.
- For 2004 to 2006 combined, the rate of postpartum depression up to 12 months after delivery was 13.1 (per 100 hospital deliveries) for women under 20 years of age, compared with 9.1 for women 35 to 39 years of age.

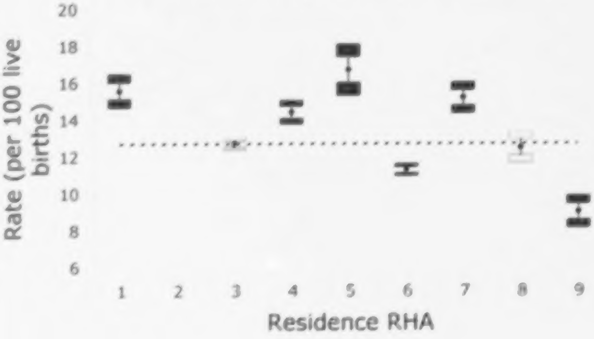
## 4.8.1 Maternal Postnatal Morbidity

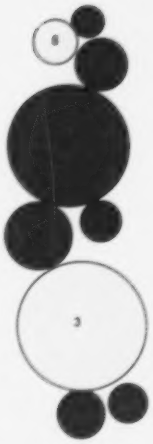
Overall Postpartum Hemorrhage Rate, 2004-06 Combined



### Regional Data (see Tables 4.8.1.3)

Overall Postpartum Hemorrhage Rate by Residence RHA, Alberta, 2004 to 2006





- For 2004 to 2006 combined, the overall rate of postpartum hemorrhage was lower than the provincial average in RHAs 2, 6, and 9. The lowest rate was in RHA 9 (9.0 per 100 live births).
- The overall rate was higher than the provincial average in RHAs 1, 4, 6, and 7, with the highest rate in RHA 5 (16.7).
- The rate of postpartum depression diagnosed prior to 12 months after delivery was lower than the provincial average in RHAs 3 and 9 between 2004 and 2006. The lowest rate was 7.3 (per 100 hospital deliveries) in RHA 9.
- The 12-month postpartum depression rate was higher than the provincial average in RHAs 1, 2, 7, and 8. The highest rate was in RHA 1 (11.6 per 100 hospital deliveries).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002 maternal postnatal morbidity data to data from prior years due to changes in data coding systems.

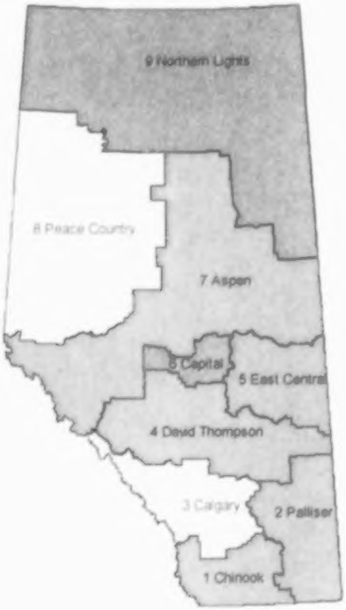
The number of women with a given disease/condition was defined by the first three diagnoses (for Fee-for-Service claims) or the first six diagnoses (Ambulatory Care Classification System and Hospital Inpatient files) recorded in the database. Only the first visit within each year for the diagnosis was counted.

Postpartum hemorrhage and postpartum depression data did not include out-of-hospital births.

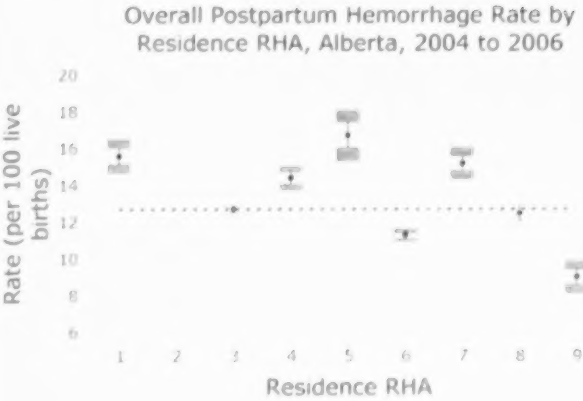
See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

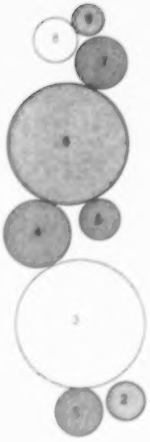
## 4.8.1 Maternal Postnatal Morbidity

Overall Postpartum Hemorrhage Rate, 2004-06 Combined



## Regional Data (see Tables 4.8.1.3)





- For 2004 to 2006 combined, the overall rate of postpartum hemorrhage was lower than the provincial average in RHAs 2, 6, and 9. The lowest rate was in RHA 9 (9.0 per 100 live births).
- The overall rate was higher than the provincial average in RHAs 1, 4, 6, and 7, with the highest rate in RHA 5 (16.7).
- The rate of postpartum depression diagnosed prior to 12 months after delivery was lower than the provincial average in RHAs 3 and 9 between 2004 and 2006. The lowest rate was 7.3 (per 100 hospital deliveries) in RHA 9.
- The 12-month postpartum depression rate was higher than the provincial average in RHAs 1, 2, 7, and 8. The highest rate was in RHA 1 (11.6 per 100 hospital deliveries).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

### Limitations and Methodology Notes

Detailed criteria for data extraction are provided in Appendix 6.1.1.

See the Methodology and Limitations section in the Introduction (page 15) for a caution regarding comparison of 2002 maternal postnatal morbidity data to data from prior years due to changes in data coding systems.

The number of women with a given disease/condition was defined by the first three diagnoses (for Fee-for-Service claims) or the first six diagnoses (Ambulatory Care Classification System and Hospital Inpatient files) recorded in the database. Only the first visit within each year for the diagnosis was counted.

Postpartum hemorrhage and postpartum depression data did not include out of hospital births.

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.8.1.1 Postpartum Hemorrhage Cases and Rate by Case Type and Year, Alberta, 1997 to 2006

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births** | 36,550 | 37,529 | 37,778 | 36,625 | 37,226 | 38,293 | 39,868 | 40,292 | 41,587 | 44,659 |
| **Early cases** | 2,559 | 2,700 | 2,999 | 2,913 | 2,879 | 2,840 | 3,063 | 3,041 | 3,381 | 3,862 |
| **Rate (per 100 live births)** | 7.0 | 7.2 | 7.9 | 8.0 | 7.7 | 7.4 | 7.7 | 7.5 | 8.1 | 8.6 |
| **Standard Error (SE)** | 0.13 | 0.13 | 0.14 | 0.14 | 0.14 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| **Late cases** | 745 | 941 | 968 | 938 | 854 | 936 | 923 | 971 | 926 | 1,036 |
| **Rate (per 100 live births)** | 2.0 | 2.5 | 2.6 | 2.6 | 2.3 | 2.4 | 2.3 | 2.4 | 2.2 | 2.3 |
| **Standard Error (SE)** | 0.07 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.07 | 0.07 |
| **All cases** | 3,871 | 4,255 | 4,592 | 4,596 | 4,446 | 4,506 | 4,731 | 4,826 | 5,210 | 5,999 |
| **Rate (per 100 live births)** | 10.6 | 11.3 | 12.2 | 12.5 | 11.9 | 11.8 | 11.9 | 12.0 | 12.5 | 13.4 |
| **Standard Error (SE)** | 0.16 | 0.16 | 0.17 | 0.17 | 0.17 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 |

Table 4.8.1.2 Postpartum Hemorrhage Cases and Rate by Case and Type Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Live births** | 6,545 | 24,482 | 39,808 | 36,692 | 15,904 | 3,105 | 126,539 |
| **Early cases** | 650 | 2,059 | 3,264 | 2,801 | 1,136 | 214 | 10,284 |
| **Rate (per 100 live births)** | 9.9 | 8.4 | 8.2 | 7.6 | 7.1 | 6.9 | 8.1 |
| **Standard Error (SE)** | 0.37 | 0.18 | 0.14 | 0.14 | 0.20 | 0.45 | 0.08 |
| **Late cases** | 204 | 686 | 905 | 778 | 290 | 54 | 2,933 |
| **Rate (per 100 live births)** | 3.1 | 2.8 | 2.3 | 2.1 | 1.8 | 1.7 | 2.3 |
| **Standard Error (SE)** | 0.21 | 0.11 | 0.07 | 0.08 | 0.11 | 0.23 | 0.04 |
| **All cases** | 1,042 | 3,382 | 5,041 | 4,286 | 1,746 | 360 | 16,035 |
| **Rate (per 100 live births)** | 15.9 | 13.8 | 12.7 | 11.7 | 11.0 | 11.6 | 12.7 |
| **Standard Error (SE)** | 0.45 | 0.22 | 0.17 | 0.17 | 0.25 | 0.57 | 0.09 |

Table 4.8.1.3 Postpartum Hemorrhage Cases and Rate by Case Type and Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Live births** | 6,396 | 3,991 | 46,379 | 11,863 | 2,871 | 37,152 | 7,365 | 6,333 | 4,186 | 126,539 |
| **Early cases** | 687 | 314 | 3,959 | 1,099 | 278 | 2,614 | 624 | 487 | 222 | 10,284 |
| **Rate (per 100 live births)** | 10.7 | 7.9 | 8.5 | 9.3 | 9.7 | 7.0 | 8.5 | 7.7 | 5.3 | 8.1 |
| **Standard Error (SE)** | 0.39 | 0.43 | 0.13 | 0.27 | 0.55 | 0.13 | 0.32 | 0.33 | 0.35 | 0.08 |
| **Late cases** | 124 | 88 | 912 | 380 | 120 | 820 | 202 | 190 | 97 | 2,933 |
| **Rate (per 100 live births)** | 1.9 | 2.2 | 2.0 | 3.2 | 4.2 | 2.2 | 2.7 | 3.0 | 2.3 | 2.3 |
| **Standard Error (SE)** | 0.17 | 0.23 | 0.06 | 0.16 | 0.37 | 0.08 | 0.19 | 0.21 | 0.23 | 0.04 |
| **All cases** | 995 | 511 | 5,878 | 1,707 | 479 | 4,183 | 1,117 | 789 | 376 | 16,035 |
| **Rate (per 100 live births)** | 15.6 | 12.8 | 12.7 | 14.4 | 16.7 | 11.3 | 15.2 | 12.5 | 9.0 | 12.7 |
| **Standard Error (SE)** | 0.45 | 0.53 | 0.15 | 0.32 | 0.70 | 0.16 | 0.42 | 0.41 | 0.44 | 0.09 |

**Sources:** Alberta Health and Wellness. Fee for Service Claims File, August 2008 extraction.
Alberta Health and Wellness. Ambulatory Care Classification System (ACCS), August 2008 extraction.
Alberta Health and Wellness. Inpatient Hospital Morbidity Data, August 2008 extraction.
Alberta Health and Wellness. Alberta Health Care Insurance Plan(AHCIP) Registration File, August 2008 extraction.

**Notes:** Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of extraction.

Table 4.8.1.4 Prenatal and Postpartum Depression Cases and Rates, Alberta, 2002 to 2006

| | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|
| **Hospital deliveries** | 38,146 | 39,652 | 40,236 | 41,478 | 44408 |
| **Prenatal depression** | | | | | |
| **Cases** | 960 | 1,028 | 1,006 | 1,135 | 1,208 |
| **Rate (per 100 hospital deliveries)** | 2.5 | 2.6 | 2.5 | 2.7 | 2.7 |
| **Postpartum depression** | | | | | |
| **Up to 1 month** | | | | | |
| **Cases** | 725 | 780 | 774 | 873 | 903 |
| **Rate (per 100 hospital deliveries)** | 1.9 | 2.0 | 1.9 | 2.1 | 2.0 |
| **Up to 6 months** | | | | | |
| **Cases** | 2,403 | 2,713 | 2,683 | 2,997 | 3,028 |
| **Rate (per 100 hospital deliveries)** | 6.3 | 6.8 | 6.7 | 7.2 | 6.8 |
| **Up to 12 months** | | | | | |
| **Cases** | 3,650 | 4,010 | 3,937 | 4,333 | 4,455 |
| **Rate (per 100 hospital deliveries)** | 9.6 | 10.1 | 9.8 | 10.4 | 10.0 |
| **Up to 24 months** | | | | | |
| **Cases** | 4,632 | 4,976 | 4,872 | 5,314 | 5,404 |
| **Rate (per 100 hospital deliveries)** | 12.1 | 12.5 | 12.1 | 12.8 | 12.2 |

Table 4.8.1.5 Prenatal and Postpartum Depression Cases and Rate by Maternal Age Group, Alberta, 2004 to 2006 Combined

| | <20 | 20-24 | 25-29 | 30-34 | 35-39 | >39 | All |
|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 6,471 | 24,288 | 39,408 | 35,977 | 15,576 | 3,025 | 124,748 |
| **Prenatal depression** | | | | | | | |
| **Cases** | 171 | 643 | 982 | 1,008 | 462 | 83 | 3,349 |
| **Rate (per 100 hospital deliveries)** | 2.6 | 2.6 | 2.5 | 2.8 | 3.0 | 2.7 | 2.7 |
| **Postpartum depression** | | | | | | | |
| **Up to 1 month** | | | | | | | |
| **Cases** | 162 | 528 | 758 | 724 | 304 | 74 | 2,550 |
| **Rate (per 100 hospital deliveries)** | 2.5 | 2.2 | 1.9 | 2.0 | 2.0 | 2.4 | 2.0 |
| **Up to 6 months** | | | | | | | |
| **Cases** | 563 | 1,965 | 2,728 | 2,332 | 929 | 191 | 8,708 |
| **Rate (per 100 hospital deliveries)** | 8.7 | 8.1 | 6.9 | 6.5 | 6.0 | 6.3 | 7.0 |
| **Up to 12 months** | | | | | | | |
| **Cases** | 842 | 2,923 | 3,936 | 3,294 | 1,424 | 306 | 12,725 |
| **Rate (per 100 hospital deliveries)** | 13.0 | 12.0 | 10.0 | 9.2 | 9.1 | 10.1 | 10.2 |
| **Up to 24 months** | | | | | | | |
| **Cases** | 1,042 | 3,608 | 4,829 | 4,003 | 1,740 | 368 | 15,590 |
| **Rate (per 100 hospital deliveries)** | 16.1 | 14.9 | 12.3 | 11.1 | 11.2 | 12.2 | 12.5 |

**Sources:** Alberta Health and Wellness, Fee for Service Claims File, August 2008 extraction
Alberta Health and Wellness. Ambulatory Care Classification System (ACCS), August 2008 extraction
Alberta Health and Wellness. Inpatient Hospital Morbidity Data, August 2008 extraction
Alberta Health and Wellness. Alberta Health Care Insurance Plan(AHCIP) Registration File, August 2008 extraction

**Notes:** Data include Alberta residents only
Data may differ from previously published data due to differences in definitions and dates of extraction

Table 4.8.1.6 Prenatal and Postpartum Depression Cases and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Hospital deliveries** | 6,245 | 3,912 | 45,335 | 11,599 | 2,798 | 36,280 | 7,215 | 6,219 | 4,117 | 124,748 |
| **Prenatal depression** | | | | | | | | | | |
| **Cases** | 145 | 110 | 1,202 | 310 | 59 | 1,111 | 205 | 137 | 61 | 3,349 |
| **Rate (per 100 hospital deliveries)** | 2.3 | 2.8 | 2.7 | 2.7 | 2.1 | 3.1 | 2.8 | 2.2 | 1.5 | 2.7 |
| **Postpartum depression** | | | | | | | | | | |
| **Up to 1 month** | | | | | | | | | | |
| **Cases** | 207 | 79 | 912 | 202 | 78 | 712 | 161 | 138 | 54 | 2,550 |
| **Rate (per 100 hospital deliveries)** | 3.3 | 2.0 | 2.0 | 1.7 | 2.8 | 2.0 | 2.2 | 2.2 | 1.3 | 2.0 |
| **Up to 6 months** | | | | | | | | | | |
| **Cases** | 534 | 295 | 3,143 | 790 | 194 | 2,513 | 544 | 480 | 195 | 8,708 |
| **Rate (per 100 hospital deliveries)** | 8.6 | 7.5 | 6.9 | 6.8 | 6.9 | 6.9 | 7.5 | 7.7 | 4.7 | 7.0 |
| **Up to 12 months** | | | | | | | | | | |
| **Cases** | 724 | 444 | 4,399 | 1,227 | 285 | 3,779 | 822 | 714 | 302 | 12,725 |
| **Rate (per 100 hospital deliveries)** | 11.6 | 11.3 | 9.7 | 10.6 | 10.2 | 10.4 | 11.4 | 11.5 | 7.3 | 10.2 |
| **Up to 24 months** | | | | | | | | | | |
| **Cases** | 876 | 553 | 5,356 | 1,563 | 358 | 4,623 | 986 | 869 | 369 | 15,590 |
| **Rate (per 100 hospital deliveries)** | 14.0 | 14.1 | 11.8 | 13.5 | 12.8 | 12.7 | 13.7 | 14.0 | 9.0 | 12.5 |

**Sources:** Alberta Health and Wellness. Fee for Service Claims File. August 2008 extraction

Alberta Health and Wellness. Ambulatory Care Classification System (ACCS), August 2008 extraction

Alberta Health and Wellness. Inpatient Hospital Morbidity Data. August 2008 extraction

Alberta Health and Wellness. Alberta Health Care Insurance Plan(AHCIP) Registration File. August 2008 extraction

**Notes:** The number of women with a given disease/condition defined by the first three diagnoses (for FFS claims) or the first 6 diagnoses (ACCS and inpatient) recorded in the database. Only first visit within each year for the diagnosis is counted.

Data include Alberta residents only

Data may differ from previously published data due to differences in definitions and dates of extraction.

## 4.8.2 Breastfeeding

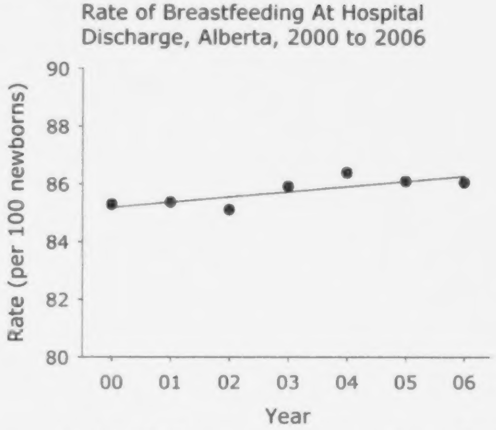
Breastfeeding newborns included those *documented as breastfeeding on discharge from hospital after birth*. This includes newborns exclusively breastfeeding as well as those receiving other sources of nutrition.

Rate of breastfeeding at hospital discharge: *Number of newborns per 100 newborns discharged from hospital who were breastfeeding when discharged.*

The World Health Organization and the Public Health Agency of Canada recommend exclusive breastfeeding up to six months of age, and continuation of supplemented breastfeeding up to two years of age and beyond (Senassero, 2008; World Health Organization/UNICEF, 1990). Only 17% of Canadian mothers were doing so in 2003. Exclusive breastfeeding for at least six months is more likely with mothers who are older, married, have higher levels of education, have higher household income, are immigrants, and are urban (Millar & Maclean, 2005).

Breastfeeding is associated with protection from gastrointestinal and respiratory infections, otitis media, allergies, respiratory infections, Type 2 diabetes, and post-neonatal death, as well as enhanced cognitive development and reductions in childhood obesity rates (Health Canada, 2003; Millar & Maclean, 2005; Wiss, Dolan, Morrow, Geraghty, and Goodman, 2008). For mothers, benefits include reduced postpartum bleeding, earlier postpartum weight loss, delayed resumption of ovulation, increased postpartum bone remineralization, and reduced risk of ovarian and breast cancer (Health Canada, 2003).

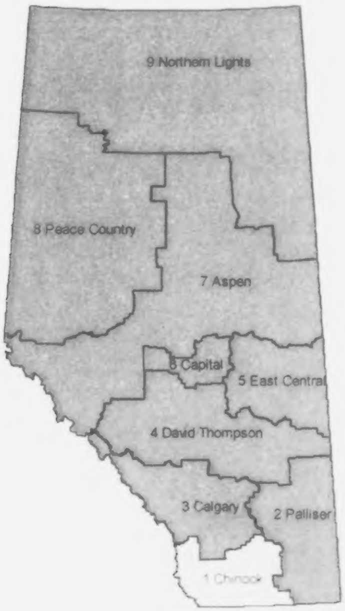
### Time Trends (see Table 4.8.2.1)



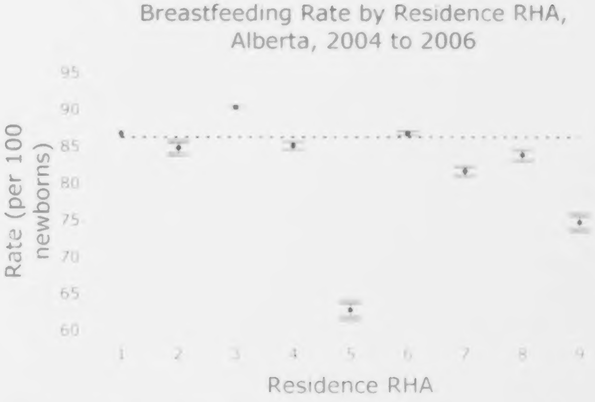
- The large majority of Alberta women initiate breastfeeding before being discharged from the hospital (only hospital births are included here). In 2006, 86.0% of newborns (37,930 newborns) were breastfeeding when discharged from the hospital.
- There was a small increase in the provincial breastfeeding rate from 85.3% in 2000 to 86.0% in 2006, with a peak at 86.4% in 2004.

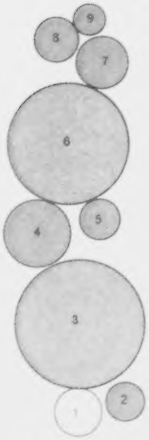
# 4.8.2 Breastfeeding

Breastfeeding Initiation Rate, 2004-06 Combined


9 Northern Lights
8 Peace Country
7 Aspen
6 Capital
5 East Central
4 David Thompson
3 Calgary
2 Palliser
1 Chinook

## Regional Data (see Tables 4.8.2.2, 4.8.2.3)





- For 2004 to 2006 combined, the rate of breastfeeding at discharge was significantly higher than the provincial rate in RHAs 3 and 6. The highest rate was in RHA 3 (90.2% of newborns).
- The breastfeeding rate was lower than the provincial average in RHAs 2, 4, 5, 7, 8, and 9. The lowest rate was in RHA 5 (62.7%).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

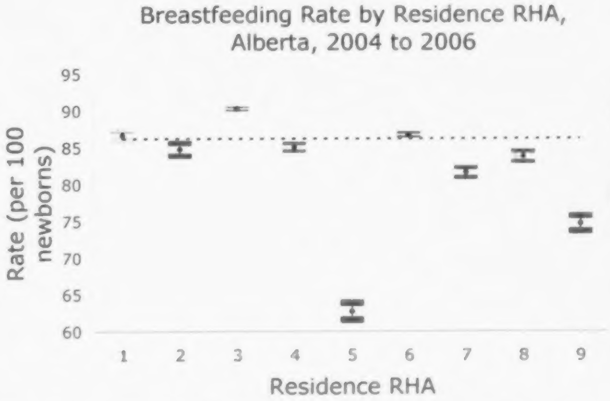
### Limitations and Methodology Notes

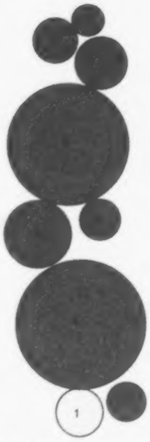
See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

## 4.8.2 Breastfeeding

Breastfeeding Initiation Rate, 2004-06 Combined

### Regional Data (see Tables 4.8.2.2, 4.8.2.3)





- For 2004 to 2006 combined, the rate of breastfeeding at discharge was significantly higher than the provincial rate in RHAs 3 and 6. The highest rate was in RHA 3 (90.2% of newborns).
- The breastfeeding rate was lower than the provincial average in RHAs 2, 4, 5, 7, 8, and 9. The lowest rate was in RHA 5 (62.7%).

See Appendix 6.3.1 for methodology and interpretation of maps, graphs, and cartograms.

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### Limitations and Methodology Notes

See the Methodology and Limitations section in the Introduction for a caution regarding interpretation of RHA 5 data.

Table 4.8.2.1 Newborns Breastfeeding and Rate by Year, Alberta, 2000 to 2006

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Newborns breastfeeding** | 30,954 | 31,450 | 32,238 | 33,921 | 34,617 | 35,493 | 37,930 |
| **Live newborns** | 36,296 | 36,846 | 37,884 | 39,488 | 40,074 | 41,233 | 44,084 |
| **Breastfeeding Rate (per 100 live births)** | 85.3 | 85.4 | 85.1 | 85.9 | 86.4 | 86.1 | 86.0 |
| **Standard Error (SE)** | 0.19 | 0.18 | 0.18 | 0.18 | 0.17 | 0.17 | 0.17 |

Table 4.8.2.2 Newborns Breastfeeding and Rate by Residence RHA, Alberta, 2004 to 2006 Combined

| | Chinook | Palliser | Calgary | David Thompson | East Central | Capital | Aspen | Peace Country | Northern Lights | Alberta |
|---|---|---|---|---|---|---|---|---|---|---|
| **Newborns breastfeeding** | 5,449 | 3,317 | 40,910 | 9,959 | 2,463 | 31,742 | 5,965 | 5,208 | 3,027 | 108,040 |
| **Live newborns** | 6,291 | 3,915 | 45,331 | 11,712 | 3,927 | 36,620 | 7,313 | 6,218 | 4,058 | 125,385 |
| **Breastfeeding Rate (per 100 live births)** | 86.6 | 84.7 | 90.2 | 85.0 | 62.7 | 86.7 | 81.6 | 83.8 | 74.6 | 86.2 |
| **Standard Error (SE)** | 0.43 | 0.57 | 0.14 | 0.33 | 0.77 | 0.18 | 0.45 | 0.47 | 0.68 | 0.10 |

**Source:** Hospital Inpatient Files, Alberta Health and Wellness, May 2008 extraction

**Notes:** Data include Alberta residents only

Totals for RHAs include unknown ages or RHAs

Data may differ from previously published data due to differences in definitions and dates of data extraction

Table 4.8.2.3 Newborns Breastfeeding and Rate by Year and Residence RHA, Alberta, 2000 to 2006

| **Newborns breastfeeding** | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Chinook** | 1,680 | 1,679 | 1,698 | 1,790 | 1,760 | 1,791 | 1,898 |
| **Palliser** | 989 | 1,020 | 1,031 | 1,023 | 1,090 | 1,101 | 1,126 |
| **Calgary** | 11,492 | 11,529 | 11,910 | 12,874 | 12,967 | 13,609 | 14,334 |
| **David Thompson** | 2,955 | 2,943 | 3,079 | 3,121 | 3,239 | 3,234 | 3,486 |
| **East Central** | 760 | 743 | 773 | 749 | 824 | 783 | 856 |
| **Capital** | 8,867 | 9,072 | 9,213 | 9,793 | 10,131 | 10,283 | 11,328 |
| **Aspen** | 1,783 | 1,930 | 1,913 | 1,899 | 1,940 | 1,949 | 2,076 |
| **Peace Country** | 1,535 | 1,585 | 1,603 | 1,668 | 1,628 | 1,732 | 1,848 |
| **Northern Lights** | 893 | 949 | 1,018 | 1,003 | 1,038 | 1,011 | 978 |
| **Alberta** | 30,954 | 31,450 | 32,238 | 33,921 | 34,617 | 35,493 | 37,930 |

| **Rate (per 100 live newborns)** | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|---|---|---|
| **Chinook** | 87.1 | 86.6 | 87.8 | 87.7 | 86.9 | 87.4 | 85.6 |
| **Palliser** | 83.1 | 84.0 | 84.1 | 82.3 | 86.3 | 84.0 | 84.0 |
| **Calgary** | 89.5 | 89.9 | 89.6 | 90.8 | 90.3 | 90.3 | 90.2 |
| **David Thompson** | 86.3 | 85.9 | 86.2 | 84.1 | 86.8 | 84.9 | 83.6 |
| **East Central** | 68.3 | 67.5 | 66.1 | 62.6 | 64.3 | 62.0 | 61.9 |
| **Capital** | 83.2 | 83.2 | 82.9 | 85.2 | 86.1 | 86.2 | 87.7 |
| **Aspen** | 80.0 | 82.0 | 80.8 | 81.4 | 81.7 | 81.5 | 81.5 |
| **Peace Country** | 84.6 | 83.4 | 83.5 | 83.1 | 84.1 | 84.2 | 83.0 |
| **Northern Lights** | 80.5 | 79.7 | 79.0 | 78.4 | 78.2 | 75.2 | 70.6 |
| **Alberta** | 85.3 | 85.4 | 85.1 | 85.9 | 86.4 | 86.1 | 86.0 |

**Source:** Hospital Inpatient Files, Alberta Health and Wellness, May 2008 release.

**Notes:** Data include out-of-province residents.

Totals for RHAs include unknown RHAs.

Data may differ from previously published data due to differences in definitions and dates of data extraction

# *5. References*

## *5.1 References*

# 5. References

## 5.1 References

## 5.1.1 References

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# 6. Appendices

*6.1 Codes used for data extraction*
*6.2 Mortality definitions*
*6.3 Epidemiologic measures for maps*
*6.4 Populations*

# 6. Appendices

## 6.1 Codes used for data extraction

ALBERTA
Perinatal Health
PROGRAM

ALBERTA REPRODUCTIVE HEALTH
PREGNANCIES AND BIRTHS 2009

Government
of Alberta

## 6.1.1 Codes Used for Data Extraction

ICD-9-CM: International Classification of Disease – 9th Revision – Clinical Modification
ICD-10-CA: International Statistical Classification of Diseases and Related Health Problems Tenth Revision, Canada
CCI: Canadian Classification of Health Interventions
*Where the symbol ^^ occurs, all codes with the given prefix were included*

**Spontaneous abortion, January 1997 to December 2007**

- Fee-For-Service Claims diagnostic code
  - ICD-9-CM 634

**Induced abortion, January 1997 to December 2007, by year, maternal age group, and residence RHA**

- Fee-For-Service Claims diagnostic code
  - ICD-9-CM 635-636
- Fee-For-Service Claims billing code
  - 86.41, 87.0, 87.0A, 87.1, 87.21, 87.29A

**Induced abortion, January 1997 to March 2002, by facility type, facility region, and week of gestation**

- Inpatient Hospital Separations and Ambulatory Care Classification System health service codes
  - 86.41, 87.0, 87.0A, 87.1, 87.21

**Induced abortion, April 2002 to December 2007, by facility type, facility region, and week of gestation**

- Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
  - Medical abortion ICD-10-CA O04^^
- Inpatient Hospital Separations and Ambulatory Care Classification System intervention codes:
  - Medical termination CCI 5CA88.^^
  - Surgical aspiration and curettage CCI 5CA89GA
  - Surgical dilatation and curettage CCI 5CA89GC

**Hospital delivery, January 1997 to December 2006**

- Hospital Inpatient Files
  - Program Area as Main Patient Service code 51

**Induction of labour**

If a delivery was counted in "Combined Induction", it was not counted in "Medical Induction" or "Surgical Induction" (i.e., these three categories are mutually exclusive).

From April 2002 to March 2003, inductions performed on outpatient bases were not captured, resulting in under-estimation of induction rates for this time period. From April 2003 onward, outpatient inductions were included in total inductions but were not categorized as medical, surgical, or combined. Consequently, "total inductions" is greater than the sum of medical, surgical, and combined from 2003 onward.

**Induction of labour, January 1997 to December 2001**

- Hospital Inpatient Files procedure codes
  - Medical induction ICD-9-CM 73.4
  - Surgical induction ICD-9-CM 73.01, 73.1
  - Combined induction ICD-9-CM 73.4, and 73.01 or 73.1

**Induction of labour, January 2002 to March 2006**

- Hospital Inpatient Files intervention codes
  - Medical induction CCI 5AC30AL, 5AC30AZ, 5AC30CA, 5AC30GU, 5AC30HA, 5AC30YA, 5AC30YB, 5AC30ZZ
  - Surgical induction CCI 5AC30AN, 5AC30AP, 5AC30CK
  - Combined induction One of CCI 5AC30AL, 5AC30AZ, 5AC30CA, 5AC30GU, 5AC30HA, 5AC30YA, 5AC30YB, 5AC30ZZ, and one of 5AC30AN, 5AC30AP, 5AC30CK

**Induction of labour, April to December 2006**

- Hospital Inpatient Files intervention codes
  - Medical Induction CCI 5AC30AL-I2, 5AC30AZ, 5AC30CA-I2, 5AC30CA-Z9, 5AC30CK-A2, 5AC30CK-I2, 5AC30HA-I2, 5AC30YA-I2
  - Surgical Induction CCI 5AC30AN, 5AC30AP, 5AC30CK-BD, 5AC30CK-W6
  - Combined Induction One of CI 5AC30AL-I2, 5AC30AZ, 5AC30CA-I2, 5AC30CA-Z9, 5AC30CK-A2, 5AC30CK-I2, 5AC30HA-I2, 5AC30YA-I2, and one of CCI 5AC30AN, 5AC30AP, 5AC30CK-BD, 5AC30CK-W6

**Normal delivery, January 1999 to December 2007**

- Fee-For-Service Claims diagnostic code
  - ICD-9-CM 650

**Operative/assisted delivery, January 1997 to March 2002**

- Hospital Inpatient Files procedure codes
  - Cesarean section and removal of fetus ICD-9-CM 74 (74.91 (hysterotomy to terminate pregnancy) was excluded).
  - Low forceps operation ICD-9-CM 72.0
  - Low forceps operation with episiotomy ICD-9-CM 72.1
  - Mid forceps operation ICD-9-CM 72.2
  - Mid forceps with episiotomy ICD-9-CM 72.21
  - Other mid forceps operation ICD-9-CM 72.29
  - High forceps operation ICD-9-CM 72.3
  - High forceps operation with episiotomy ICD-9-CM 72.31
  - Other high forceps operation ICD-9-CM 72.39
  - Vacuum extraction ICD-9-CM 72.7
  - Vacuum extraction with episiotomy ICD-9-CM 72.71

**Operative/assisted delivery, April 2002 to December 2006**

- Hospital Inpatient Files intervention codes
  - Forceps traction and rotation delivery CCI 5MD53.^^, 5MD55.^^, 5.MD.60.RG, 5.MD.60.JZ, 5.MD.60.KC, 5.MD.60.RA, 5.MD.60.RE, 5.MD.60.JW, 5.MD.60.RG , 5.MD.60.CB, 5.MD.60.CC, 5.MD.60.CD, 5.MD.60.CE, 5.MD.60.CF, 5.MD.60.CG
  - Vacuum traction delivery CCI 5MD54.^^, 5MD55.^^, 5.MD.60.RD, 5.MD.60.KA, 5.MD.60.KD, 5.MD.60.RB, 5.MD.60.RF, 5.MD.60.JX, 5.MD.60.RH, 5.MD.60.CB, 5.MD.60.CC, 5.MD.60.CD, 5.MD.60.CE, 5.MD.60.CF, 5.MD.60.CG
  - Combination of vacuum and forceps delivery CCI 5MD55.^^
  - Cesarean section delivery CCI 5MD60.^^

**Shoulder dystocia, January 1997 to March 2002**

- Fee-For-Service Claims, Inpatient Hospital Separations, and Ambulatory Care Classification System diagnostic code
  - ICD-9-CM 660.4

**Shoulder dystocia, April 2002 to December 2006**

- Fee-For-Service Claims diagnostic code
  - ICD-9-CM 660.4
- Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
  - ICD-10-CA O66.0

**Respiratory distress syndrome, January 1997 to March 2002**

- Fee-For-Service Claims, Inpatient Hospital Separations, and Ambulatory Care Classification System diagnostic code
  - ICD-9-CM 769

**Respiratory distress syndrome, April 2002 to December 2006**

- Fee-For-Service Claims diagnostic code
  - ICD-9-CM 769
- Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
  - ICD-10-CA P22.0

**Congenital anomalies, January 1997 to March 2002**

- Alberta Congenital Anomalies Surveillance System diagnostic codes
  - Neural Tube Defects ICD-9-CM 740.0-742.0

Heart Septal Defect ICD-9-CM 745.0-745.9
Down Syndrome ICD-9-CM 758.0
Urinary obstructive anomalies ICD-9-CM 753.2
All congenital anomalies combined
Nervous System Anomalies ICD-9-CM 740.0-742.9
Eye Anomalies ICD-9-CM 743.0-743.9
Ear, Face and Neck ICD-9-CM 744.0-744.9
Cardiovascular System Defect ICD-9-CM 745.0-747.9
Respiratory System Anomalies ICD-9-CM 748.0-748.9
Digestive System Anomalies ICD-9-CM 749.0-751.9
Genital Organ Anomalies ICD-9-CM 752.0-752.9
Urinary System Anomalies ICD-9-CM 753.0-753.9
Musculoskeletal Anomalies ICD-9-CM 754.0-756.9
Integument Anomalies ICD-9-CM 757.0-757.9
Chromosomal Anomalies ICD-9-CM 758.0-758.9
Other and Unspecified Anomalies ICD-9-CM 759.0-759.9
Other malformations, deformations, disruptions, and dysplasias present at birth, occurring outside ICD-9-CM 740.0 to 759.9

**Congenital anomalies, April 2002 to December 2006**
Alberta Congenital Anomalies Surveillance System diagnostic codes
Neural tube defects ICD-10 Q00, Q01, Q05
Heart septal defects ICD-10 Q20-Q21
Down syndrome ICD-10 Q90
Urinary obstructive anomalies ICD-10 Q62
All congenital anomalies combined
Congenital malformations of the nervous system ICD-10-CA Q00-Q07
Congenital malformations of eye, ear, face and neck ICD-10-CA Q10-Q18
Congenital malformations of the circulatory system ICD-10-CA Q20-Q28
Congenital malformations of the respiratory system ICD-10-CA Q30-Q34
Cleft lip and cleft palate ICD-10-CA Q35-Q37
Other congenital malformations of the digestive system ICD-10-CA Q38-Q45
Congenital malformations of genital organs ICD-10-CA Q50-Q56
Congenital malformations of the urinary system ICD-10-CA Q60-Q64
Congenital malformations and deformations of the musculoskeletal system ICD-10-CA Q65-Q79
Other congenital malformations ICD-10-CA Q80-Q89
Chromosomal abnormalities, not elsewhere classified ICD-10-CA Q90-Q99
Other malformations, deformations, disruptions, and dysplasias present at birth, occurring outside ICD-10 Q00 to Q99

**Postpartum hemorrhage, January 1997 to March 2002**
Fee-For-Service Claims, Inpatient Hospital Separations, and Ambulatory Care Classification System diagnostic code
ICD-9-CM 666
**Postpartum hemorrhage, April 2002 to December 2006**
Fee-For-Service Claims diagnostic Code
ICD-9-CM 666
Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
ICD-10-CA O72

**Postpartum depression, January 1997 to March 2002**
Fee-For-Service Claims, Inpatient Hospital Separations, and Ambulatory Care Classification System diagnostic code
ICD-9-CM 296.2-296.3, 311
**Postpartum depression, April 2002 to December 2006**
Fee-For-Service Claims diagnostic Code
ICD-9-CM 296.2-296.3, 311
Inpatient Hospital Separations and Ambulatory Care Classification System diagnostic code
ICD-10-CA F32-F33, F53

# 6. Appendices

## 6.2 Mortality definitions

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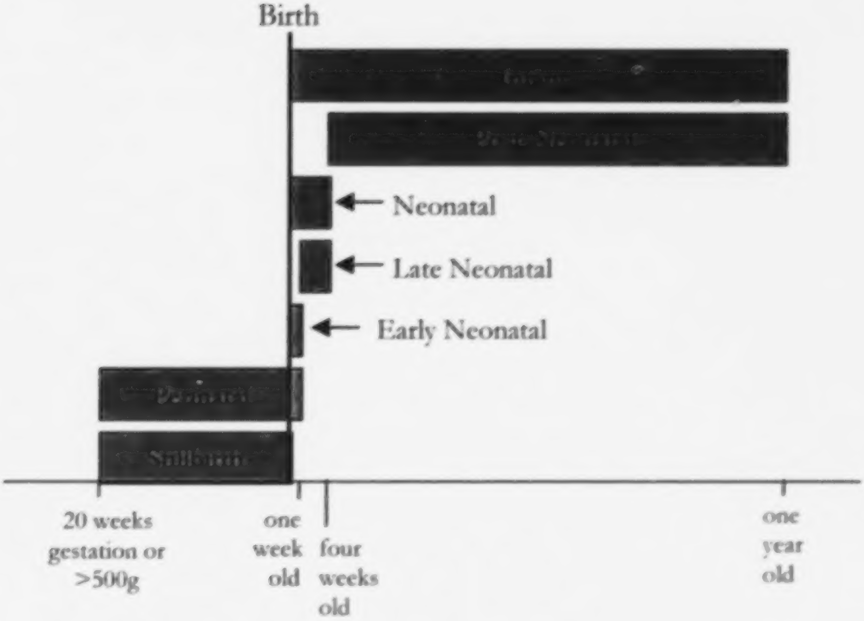
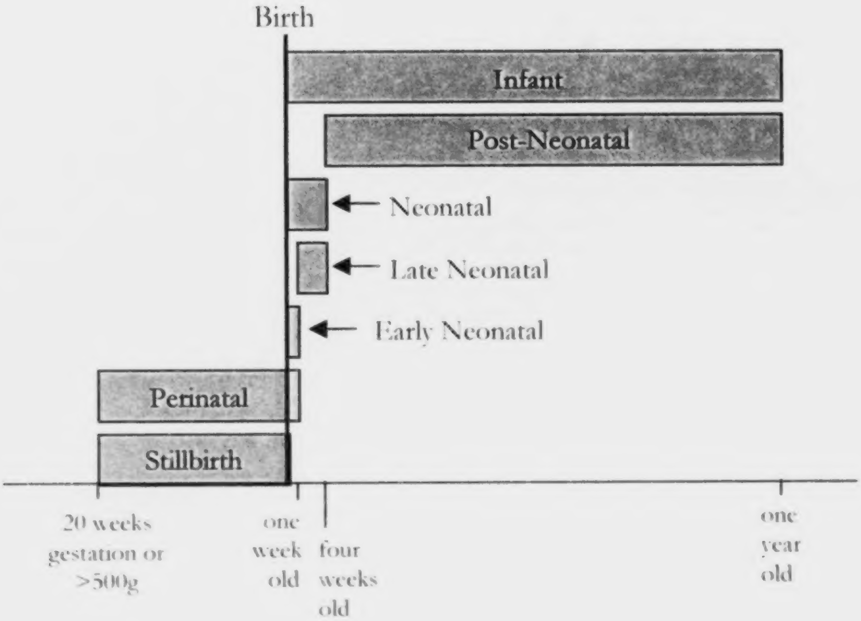
## 6.2.1 Mortality Definitions


Birth
Infant
Post-Neonatal
Neonatal
Late Neonatal
Early Neonatal
Perinatal
Stillbirth
20 weeks gestation or >500g
one week old
four weeks old
one year old

| Type of Death | Definition |
|---|---|
| Infant | Death prior to one year of age |
| Post-Neonatal | Death at four weeks of age or later, prior to one year of age |
| Neonatal | Death prior to four full weeks of age |
| Late Neonatal | Death at one week of age or later, prior to four weeks of age |
| Early Neonatal | Death prior to one full week of age |
| Perinatal | Stillbirth or early neonatal death |
| Stillbirth | Death prior to birth, at 20 weeks gestation or later, or weighing 500 grams or more |

## 6.2.1 Mortality Definitions


Birth
Infant
Post-Neonatal
Neonatal
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# 6. Appendices

## 6.3 Epidemiologic measures for maps

Alberta Perinatal Health Program

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# 6.3.1 Epidemiologic Measures for Maps

Written by Dr. Donald Schopflocher and Erik Ellehoj

All health events reported in this document are mapped according to the method described below. This method was developed to address the issue of how population sizes of health regions can affect rate stability. Specifically, rates will be less stable for RHAs with smaller populations than those for RHAs with larger populations. The mapping method used in this report is designed to address this issue and allow statistically consistent interpretations. (As an example the numbers shown in the calculations in Steps 1, 2 and 3 below are for low birth weight babies born in the Chinook, Palliser and Northern Lights health regions and compared against provincial rates from 2000 to 2002.)

The mapping method consists of the following seven steps:

1. Calculate the rates for each region. For crude rates, an example of this calculation is shown below. *Note: where sex-age standardized rates are used a more detailed calculation would be required.*

| Health Region # | Low Birth Weight (LBW) | Total Live Births | Proportion LBW |
|---|---|---|---|
| 1 | 331 | 5,874 | 0.056 |
| 2 | 213 | 3,677 | 0.058 |
| . | . | . | . |
| . | . | . | . |
| . | . | . | . |
| 9 | 175 | 3,602 | 0.049 |

2. Calculate the rate for the province. For crude rates, an example of this calculation is shown below. *Note: where sex-age standardized rates are used a more detailed calculation would be required.*

Number of low birth weight newborns: 6,999
Total number of live births: 112,133
Proportion low birth weight: 6,999 / 112,133 = 0.062

3. Calculate standard error of a probability of a health event for each regional rate. For crude rates the formula which follows can be used. *Note: where sex- age standardized rates are used a more detailed calculation would be required.*

$$\sqrt{\frac{p(1-p)}{n}}$$

Where: p is the proportion (estimate of probability) for the region
n is the number of births.

| Health Region # | Low Birth Weight | Total Births | Proportion LBW | Calculation | Standard Error |
|---|---|---|---|---|---|
| 1 | 331 | 5,874 | 0.056 | $\sqrt{\dfrac{0.056(1-0.056)}{5,874}}$ | 0.0030 |
| 2 | 213 | 3,677 | 0.058 | $\sqrt{\dfrac{0.058(1-0.058)}{3,677}}$ | 0.0038 |
| . | . | . | . | . | . |
| . | . | . | . | . | . |
| . | . | . | . | . | . |
| 9 | 175 | 3,602 | 0.049 | $\sqrt{\dfrac{0.049(1-0.049)}{3,602}}$ | 0.0036 |

4. Calculate the regional-specific standard scores.

Subtract the regional proportion from the provincial proportion and divide these by the standard error derived for each region in step 3. Repeat for each region.

$$\text{Score} = \frac{\text{regional proportion} - \text{provincial proportion}}{\text{regional standard error}}$$

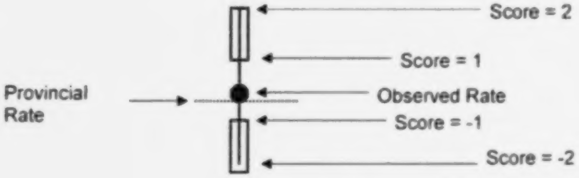
5. Graph the regional-specific standard scores calculated in Step 4.

The following colour scheme is used to differentiate the rates that may differ from the provincial average.

| Score | Interpretation | Colour |
|---|---|---|
| ≥ 2 | Higher than provincial average (significant difference in a conventional statistical test (p<0.05) | Red |
| ≥ 1 and < 2 | probably higher than provincial average (p > 0.5 but < 0.95 that difference is not due to random variation) | Orange |
| < 1 and > -1 | Not likely to differ from provincial average (p< 0.5 that difference is not due to random variation) | Yellow |
| ≤ -1 and > -2 | Probably lower than provincial average (p > 0.5 but < 0.95 that difference is not due to random variation) | Light green |
| ≤ -2 | Lower than provincial average (significant difference in a conventional statistical test (p<0.05) | Dark green |

The figure below illustrates how to interpret the graphic for an individual region. The yellow bars are used to show that the provincial rate crosses between the 1 and –1 score range. The table above lists other colour possibilities by score category.

The black dot represents the value of the rate for each region. The colour of the bars above and below the dot represents the score of the region. The portion of the bar closest to the black dot represents the value for a standard score of 1 or –1, while the part of the bars farthest from the dot represent the value for a score of 2 or –2.



6. Generate maps using the same categories for each region as listed in Step 5.

The graph and map are placed in the same page. The map allows the reader to obtain a quick overview while more detailed information is presented on the graph . The colour assigned to each region is based on the colour of the bars in the graph for the same region. This provides a spatial context to the distribution patterns and consistency among the two graphic elements.

7. Generate a cartogram.

A cartogram is similar to a map. However, each region is represented by a circle that is sized proportionately to the regional population. This graphic is useful for interpreting reported rates by providing an indication of the population size of each region. Each RHA in the cartogram is coloured the same as it is on the provincial map.

Map/graph/cartogram colour legend:

■ Significantly Lower
Lower
Average
□ Higher
■ Significantly Higher

# *6. Appendices*

## *6.4 Populations*

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# 6.4.1 Populations

Women 15 - 49 by Residence RHA, Alberta, 1998 to 2007

| Residence RHA | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| Chinook | 36,667 | 37,116 | 37,409 | 37,453 | 37,469 | 37,538 | 37,637 | 37,621 | 37,820 | 38,573 |
| Palliser | 23,095 | 23,669 | 23,990 | 24,512 | 24,876 | 24,820 | 24,991 | 25,160 | 25,302 | 25,821 |
| Calgary | 280,183 | 289,318 | 294,761 | 301,784 | 309,686 | 314,359 | 318,119 | 322,633 | 330,679 | 340,332 |
| David Thompson | 68,182 | 69,712 | 70,725 | 71,785 | 72,982 | 73,541 | 74,145 | 74,570 | 75,569 | 77,632 |
| East Central | 25,663 | 25,721 | 25,838 | 26,088 | 26,345 | 26,308 | 26,207 | 26,172 | 26,136 | 26,778 |
| Capital | 246,101 | 250,900 | 253,364 | 256,989 | 261,592 | 264,438 | 265,829 | 267,430 | 271,912 | 280,518 |
| Aspen | 44,003 | 44,416 | 44,399 | 44,765 | 45,130 | 44,774 | 44,538 | 44,291 | 44,506 | 45,256 |
| Peace Country | 32,977 | 33,660 | 33,874 | 34,118 | 34,583 | 34,705 | 35,038 | 35,364 | 36,245 | 37,336 |
| Northern Lights | 17,081 | 17,419 | 17,784 | 18,304 | 19,263 | 20,028 | 20,611 | 21,073 | 21,548 | 22,802 |
| Unknown | 107 | 50 | 38 | 115 | 38 | 49 | 59 | 35 | 50 | 79 |
| Total Women 15-49 | 774,059 | 791,981 | 802,182 | 815,913 | 831,964 | 840,560 | 847,174 | 854,349 | 869,776 | 895,127 |
| Alberta Population | 2,854,621 | 2,923,449 | 2,967,755 | 3,022,891 | 3,086,646 | 3,134,337 | 3,179,036 | 3,222,191 | 3,298,028 | 3,407,742 |

**Source**: Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness as of March 2008

**Notes**: Data may differ from previously published data due to differences in definitions and dates of data extraction

Women 10 - 49 by Age Group, Alberta, 1998 to 2007

| Age group | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10-14 | 107,146 | 108,776 | 110,073 | 110,821 | 111,927 | 112,452 | 111,565 | 110,360 | 110,161 | 109,951 |
| 15-17 | 62,489 | 64,531 | 65,499 | 66,621 | 67,490 | 67,455 | 68,065 | 69,187 | 70,552 | 71,193 |
| 18-19 | 39,617 | 40,965 | 42,723 | 44,386 | 45,513 | 45,940 | 46,249 | 46,372 | 46,284 | 47,741 |
| 15-19 | 102,106 | 105,496 | 108,222 | 111,007 | 113,003 | 113,395 | 114,314 | 115,559 | 116,836 | 118,934 |
| 20-24 | 98,376 | 102,104 | 103,552 | 106,634 | 110,520 | 113,900 | 116,575 | 118,397 | 122,100 | 127,053 |
| 25-29 | 104,141 | 105,731 | 105,981 | 106,813 | 109,731 | 111,509 | 113,764 | 116,210 | 121,374 | 128,880 |
| 30-34 | 114,614 | 112,685 | 110,998 | 112,047 | 113,471 | 114,564 | 114,582 | 115,321 | 117,553 | 122,803 |
| 35-39 | 132,964 | 133,934 | 132,554 | 129,575 | 126,332 | 122,284 | 119,152 | 117,930 | 120,304 | 123,898 |
| 40-44 | 123,113 | 127,749 | 131,234 | 133,936 | 137,029 | 138,222 | 138,573 | 137,349 | 135,051 | 133,101 |
| 45-49 | 98,745 | 104,282 | 109,643 | 115,901 | 121,878 | 126,686 | 130,214 | 133,583 | 136,558 | 140,458 |
| Women aged 15 - 49 | 774,059 | 791,981 | 802,182 | 815,913 | 831,964 | 840,560 | 847,174 | 854,349 | 869,776 | 895,127 |
| Women aged 10 - 49 | 881,205 | 900,757 | 912,255 | 926,734 | 943,891 | 953,012 | 958,739 | 964,709 | 979,937 | 1,005,078 |
| Alberta Population | 2,854,621 | 2,923,449 | 2,967,755 | 3,022,891 | 3,086,646 | 3,134,337 | 3,179,036 | 3,222,191 | 3,298,028 | 3,407,742 |

**Source**: Alberta Health Care Insurance Plan Registration File, Alberta Health and Wellness as of March 2008

**Notes**: Data may differ from previously published data due to differences in definitions and dates of data extraction